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ANORECTAL SURGERY—PRE AND POSTOPERATIVE CARE

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It is felt that, in general, too many surgeons of today are prone to regard lightly the average anorectal case, and consequently are frequently lax in their management of these patients, both before and after operation. Too often anorectal cases are considered to be minor surgery, and when so considered, the results are usually minor, and leave much to be desired.

The following is a discussion of a general method of care of these patients, which we have found highly satisfactory in our hands.

Preoperative Management

Preoperative management in anorectal surgery should be directed primarily toward complete reassurance of the patient in regard to the planned operation, and rendering the lower bowel as mechanically clean, and biologically sterile as possible. In many instances anorectal surgery is basically plastic surgery. A grave error is often made in considering anorectal surgery dirty surgery. We consider it as clean as any other large bowel surgery.

The type of pathology present, the operation planned, the probable course in the hospital, and the end result expected should be thoroughly explained to the patient. All too often patients with anorectal pathology delay treatment because of what they have heard from other patients regarding postoperative pain and con-

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tinued symptoms, which usually follow poor or improperly managed anorectal surgery.

Towards rendering the bowel biologically sterile, it has been our practice to have the patient take sulfathaladine, grams one 4 times daily for 5 days preoperatively. Sulfasuxadine may be used if desired. Those patients seen only a short time before surgery are given streptomycin, grams ½ 3 times daily, for 24 to 48 hours preoperatively. Aureomycin or chloromycetin, in comparable dosage, may be used equally as well. Since instituting this procedure we have observed that the postoperative healing time has been diminished by one to three weeks, skin tags have been reduced to less than ten per cent, and the degree of postoperative fibrosis greatly diminished.

The day before operation the patient is advised to take a good laxative of his choice. Our preference, providing there is no objection from the patient, is castor oil. This is one of the least irritating to the intestinal tract, cleans well, and after cleaning tends to inhibit bowel movements for 2 to 3 days.

The average patient is admitted to the hospital on the afternoon prior to scheduled surgery. At this time all routine laboratory studies are done, in addition to a complete history and physical examination by the surgical house officer in charge of the patient.

The perianal region is thoroughly shaved and cleaned on the evening before operation, and the patient given one of the barbiturates at bedtime. On the morning of surgery, no breakfast is allowed, and cleansing saline enemas, until the rectum is clean, are given. We feel that saline, or some other non-irritating solution, is greatly to be preferred to soapsuds for enemas, as there is much less irritation to the mucous membranes of the bowel. In our opinion soapsuds enemas should never be used, because of its inevitable caustic action on insensitive mucous membrane, thereby causing a proctitis venenata. Seconal, grains 3, is given 1½ to 2 hours before operation, and demerol, 75 to 100 milligrams, is given 45 to 60 minutes preoperatively. Atropine is omitted when saddle block spinal anesthesia is used.

Unless there is a definite contraindication, we prefer to do all work under a saddle block spinal anesthesia, 50 to 70 milligrams of procaine hydrochloride sufficing in most instances.

The prone jackknife position is used almost exclusively for operation. This position greatly improves the exposure of the involved parts, permits preoperative proctosigmoidoscopy, removal of small polypi when found, is more comfortable for the patient, the surgeon

and the assistants, results in less postoperative backache, and tends to lessen the vascularity of the anorectal region, thus permitting cleaner and more detailed dissection.

A proctosigmoidoscopy is considered an essential part of the preoperative management, and no anorectal surgery should be done without one. This might be done in the office when the patient is first examined, but often an adequate one cannot be carried out at this time due to lack of preparation, and if surgery is definitely decided upon, it is delayed, and performed immediately following the spinal anesthetic, with the patient in the prone position. Thus, there is no discomfort to the patient, and the bowel has been adequately prepared. When indicated, barium and double contrast enemas should be done, after which operation should be delayed until the bowel is well cleaned of the barium.

Postoperative Management

Following surgery, therapy is mainly directed at reduction of postoperative discomfort, and cleanliness of the operative area.

Immediate pain following anorectal procedure is primarily due to muscle spasm in the involved area. Miles states that the after pain usually increased in severity during the first 6 hours postoperatively, after which it gradually subsides over the next twenty hours. The pain felt after this period is usually due to infection.

We routinely inject the perianal tissues with 5 c.c. of one per cent Nupercaine-in-oil immediately following the operative procedure, and have seen only one case in 4 years in which a complication due to this procedure was noted, and this was of no serious consequence. The latter was a case of hemorrhoids and fistula-in-ano who developed a small abscess at one of the injection sites postoperatively, which required only a simple incision and drainage for cure.

A proctotomy, at the 1 o'clock position, is routinely performed at the end of the operative procedure on all cases which are not grossly infected, or which do not have a too relaxed sphincter preoperatively. This is usually done on about 80 per cent of our cases. We have had no incidence of fecal incontinence, or other complications, following this procedure.

The two above procedures, plus keeping down infection, have practically eliminated any severe postoperative pain.

An opium and belladonna suppository is inserted into the rectum, along with a small rubber tissue drain, the raw surfaces covered with Oxycel gauze, and Furacin ointment liberally applied to the

operative area prior to applying the dressing. The latter is held in place by a large T-binder, without strapping the buttocks with adhesive.

One of the opiates is ordered every 4 hours, if necessary for pain, and the floor nurse is instructed to give the first hypodermic on return of the patient to his room at the first suggestion of discomfort. This is frequently the only one necessary, and is given early to prevent a marked fear of pain, due primarily to what the patient may have heard about rectal surgery.

Upon returning to the room, the patient is advised against lying flat on his back, as this definitely predisposes to backache. We have had no cases of postoperative backache. The patient is permitted up as soon as completely recovered from the anesthesia, and routinely given a regular diet as soon as desired. The chemotherapeutic agent used preoperatively is continued for 5 to 10 days, and in addition, Furacin ointment is applied to the operative site twice daily.

Continuous hot witch hazel compresses to the anus are begun as soon as the full effects of the anesthesia has worn off, in general in 2 to 3 hours. Hot sitz baths are begun on the first postoperative day, and are given three times daily, and following each bowel movement. As is generally recognized, these two procedures are very important from the standpoint of cleanliness of the wound, in addition to having a soothing effect on the patient, and preventing muscle spasm.

A mild analgesic ointment, such as one per cent Surfacaine, is applied to the anal area whenever necessary for discomfort.

Metamucil, drams one in a glass of water, is given twice daily, beginning on the first postoperative day. If there has been no bowel movement by the third day following operation, a small oil retention enema is given through a soft rubber catheter, in addition to a laxative such as milk of magnesia.

The average patient is allowed home on the fourth day following operation. He takes Furacin ointment, Surfacaine ointment, witch hazel, and Metamucil with him and is encouraged to continue using these, along with hot sitz baths, until complete healing has taken place. Laxative of choice is advised, and the patient cautioned against fecal impaction, which occasionally occurs.

Following discharge from the hospital, the patient is seen in the office at weekly intervals until completely healed, which in most instances takes from 4 to 8 weeks. At each visit the anal canal is gently stretched digitally to separate the edges of the wound, to prevent contractures.

It is thus seen that we give as much attention to all details in these cases as we do in cases of large bowel surgery, and we believe that the end results fully justify this care.

SUMMARY

A method of pre and postoperative management of anorectal cases is presented in detail.

The authors believe that fully as much attention should be paid to the management of these cases as to the management of any large bowel surgery.

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CONGENITAL RIGHT-SIDED DIAPHRAGMATIC HERNIA IN CHILDREN

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Congenital herniations through the right side of the diaphragm are quite rare. When they are found they are nearly always seen in children and many times are diagnosed only at postmortem examination. While surgical repair of left-sided diaphragmatic hernias in infants and young children is still a relatively uncommon procedure, repair of hernias through the right side of the diaphragm are definitely more rare.

Relatively little appears in the literature about this condition. Usually it is mentioned only in passing in a review of the more common types of diaphragmatic hernia. There are very few isolated case reports.[1,2] Teplick and Macht[3] state that only 5 per cent of diaphragmatic hernias are right-sided. Harrington[4] in reporting 304 diaphragmatic hernias lists 1 occurring on the right side and this was not in a child. Hartzell[5] reviewed 68 cases of diaphragmatic hernia occurring in infants and children 10 years of age or under, treated by operation. Three of this series were right-sided hernias, two of which were the more simple oesophageal hiatus type. Truesdale[6] reported 1 case of right-sided diaphragmatic hernia successfully operated on in two stages in his series, and Ladd and Gross[7] report 2 cases. Hedblom[8] in his review of a very large series of all types of diaphragmatic hernias of all ages lists a number on the right side which are unclassified.

Congenital hernias of this type are due to embryological failure of development or fusion of the diaphragm and are most often found in the posterolateral portion of the diaphragm along the old pleuroperitoneal canal (foramen of Bochdalek). Others may occur through the dome of the diaphragm, through the oesophageal hiatus, through the retrosternal area (foramen of Morgagni), or through the gap left by the partial absence of the hemidiaphragm, usually in the posterior portion of the muscle.[5] Hernias at the oesophageal hiatus always have a sac while those at the foramen of Morgagni may or may not have a sac. However, those herniations through the foramen of Bochdalek usually do not have a sac.

Symptoms

A large proportion of infants born with this type hernia die in the first few hours or days of life. Since the right-sided hernias are more rare, the condition is not usually recognized as early as those

on the left side. This type of hernia may give symptoms and signs referable to respiratory, circulatory and digestive systems. Nevertheless, if the respiratory and cardiac mechanisms are able to compensate for the presence of abdominal viscera in the thorax and there is no intestinal obstruction, the infant may live into later life when the diagnosis is more readily made. However, an infant or newborn baby who has cyanosis, dyspnea, or vomiting, should have

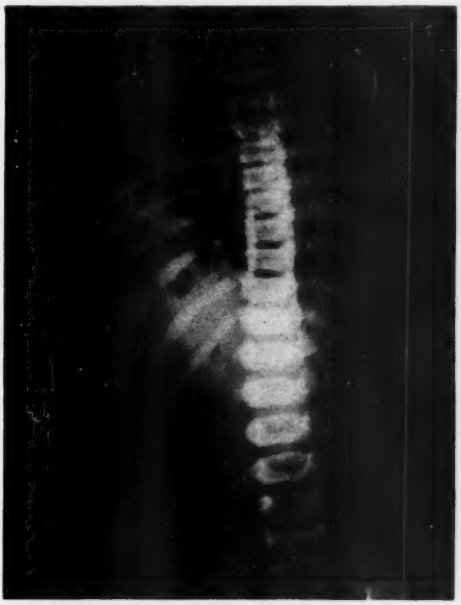

Fig. 1. Survey film of chest and abdomen showing loops of intestines in right thoracic cavity collapsing right lung and shifting mediastinum to left.

the diagnosis of diaphragmatic hernia considered and at least ruled out by x-ray which is easy enough to obtain. Cyanosis is usually noticed soon after delivery and is often at its worst during nursing and crying. It may be so severe as to require oxygen therapy to sustain life. There is usually poor weight gain or actual weight loss. Vomiting may follow most of the feedings or occur only occasionally. The child may be hungry soon after vomiting. Since this type hernia usually does not have adhesions around the intestines, the vomiting is not ordinarily that associated with acute intestinal obstruction but is due mainly to mechanical or partial intermittent obstruction. If the child does live for several months before the diagnosis is made, development is usually retarded considerably. Sometimes there are symptoms of pulmonary infection due to col-

lapse of one lung and embarrassment of the other. Systolic murmurs over the heart frequently are heard presumably due to kinking of the blood vessels.[9]

Diagnosis and X-ray Examination

Previous to the widespread use of x-ray this type of hernia was rarely diagnosed before death. Nevertheless, there are indicative signs that can be made out by physical examination such as increased respiratory and pulse rates, tympany over the right side of the chest associated with absent or distant breath sounds on that side.

Intestinal sounds may be heard over the right chest instead of breath sounds, in which case the diagnosis should be fairly evident. The abdomen is usually quite scaphoid in appearance.

However, to prove the diagnosis beyond doubt, x-rays must be made. Although a flat plate of the chest is revealing it can be misleading as well, and barium studies should be made by all means. Seeing barium filled intestines in the chest collapsing the lung and displacing the heart, of course not only confirms the diagnosis, but shows the extent of the misplaced viscera.

In the right-sided congenital hernias the liver may extend above and below a level where the diaphragm should be. Sometimes the colon can be traced from the abdomen into the chest as well as loops of small intestines. If a hernial sac is present, considerable lung tissue may be seen in the upper chest. If there is no sac very little if any lung may be made out at the apex if the hernial opening is large enough to allow abdominal viscera free access to the chest cavity.

Treatment

There is no doubt that the treatment of choice in all of these patients is surgical repair of the hernia. The relative unfamiliarity with the condition, the surgical difficulties of the operation, and the high operative mortality in the past have caused some to take a falsely conservative attitude toward surgical treatment. The futility of expectant or medical measures is well shown in the literature. The policy of waiting until the child is older and stronger is responsible for the loss of lives which might have been saved by an early operation.[7] In 1925 Hebdlom[11] reported that 75 per cent of patients with congenital diaphragmatic hernia died before they were one month old.

Operation should be performed as soon as the diagnosis is made and proper hydration and other necessary preoperative measures

are carried out such as deflating the alimentary tract by Wangensteen suction and oxygen therapy. If delayed too long the abdominal viscera "lose the right of residence" in the abdomen.

Because of the difficulty in dealing with the large right lobe of the liver in right-sided diaphragmatic hernia, there has been a dif-

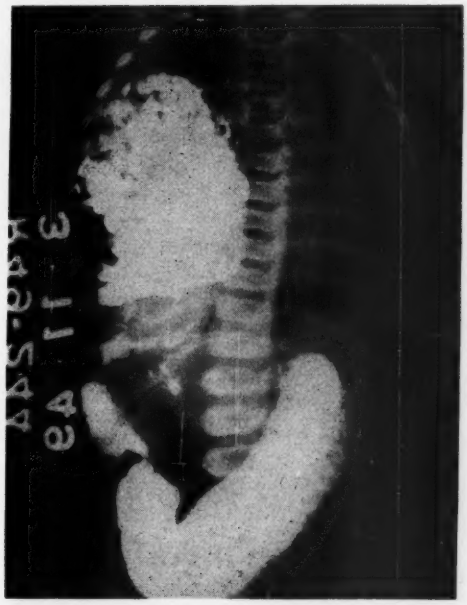

Fig. 2. Barium meal showing dilated stomach with small intestines above diaphragm on right side.

ference of opinion as to the best operative approach. Harrington[4,10] prefers the transthoracic route, as well as Weinberg[12] and others. However, most authors prefer the abdominal approach, the combined approach being used only in the last resort.[2,5,6,7,13] The operation should be performed under positive pressure or intratracheal anesthesia. In infants the problem of adhesions between the intestines and the pleura is very rare. Therefore, it is easier to pull the abdominal contents out of the chest from below than to push them down from above into an overcrowded abdominal cavity. We prefer right rectus muscle splitting incision. A large rubber catheter is placed through the hernial ring into the chest cavity to equalize the atmospheric pressure and the abdominal organs are withdrawn from the thorax. The small intestines are pulled down first followed by the colon and then the liver and gallbladder if these are in the

chest. It will be found that the liver is much more mobile than in a normal individual and retracts without too much difficulty. The edges of the hernial ring are denuded and sutured with interrupted silk with an outside layer of interrupted sutures in the peritoneum. The abdominal wall is closed in layers, using silk throughout. If there is not enough room in the abdomen to close all the layers of

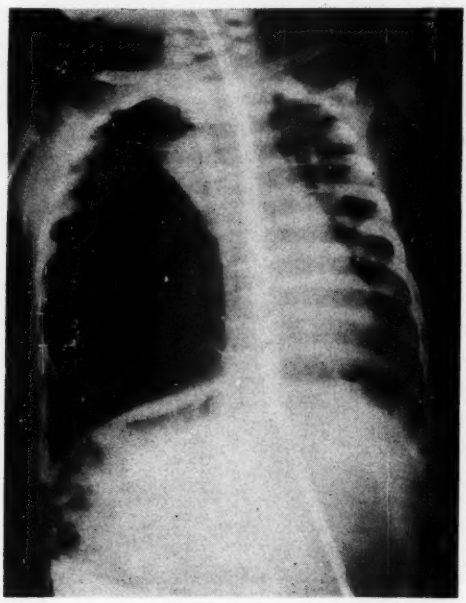

Fig. 3. First postoperative film showing repaired right diaphragm with intestines below it and right chest cavity filled with air, the right lung still completely collapsed.

the abdominal wall, the skin alone is undercut and closed leaving a ventral hernia which is repaired in about 6 days.

Since the hernias through the foramen of Morgagni are anterior in position they are somewhat easier to deal with but are approached in a similar manner. The oesophageal hiatus hernias in children are usually on the left but may be on the right side. They are operated on only if there are important symptoms such as gastric or intestinal obstruction, ulceration and bleeding from the stomach, or intractable pain. The sac must be reduced and the opening closed firmly with interrupted silk with a flap of peritoneum to cover the suture line. Sometimes it is advisable to anchor the suture line to the gastric serosa.

Preliminary crushing of the phrenic nerve is done by many[7,14,15]

but may not always be necessary. We have felt that postoperative atelectasis and other pulmonary complications may be less when this has not been done.

Postoperative care is of utmost importance. These patients need very careful watching for a few days. They should be kept in an oxygen tent for several days postoperatively. This not only relieves

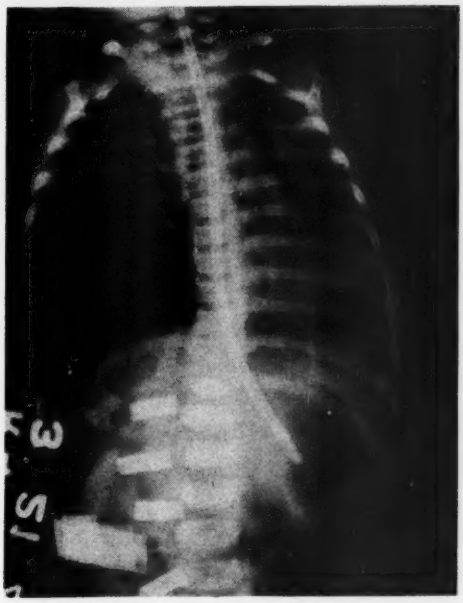

Fig. 4. Showing beginning expansion of right lung. Film taken 11 hours after operation.

the respiratory distress but also keeps down abdominal distention. A blood transfusion should be given during or immediately after the operation. The fluid and electrolyte balance must be maintained by parenteral fluids for several days. Pleural effusion must be watched for and the chest aspirated repeatedly if necessary until no more fluid forms. Penicillin is given routinely for a few days postoperatively to prevent pulmonary infection due to collapsed lung tissue.

There are no statistics as to mortality of right-sided diaphragmatic hernias available but for all types of congenital diaphragmatic hernias it has been high in the past. Hedblom[9] quotes 50.9 per cent as the overall mortality from operation. Harrington[4] reports a 19 per cent mortality. We feel that with modern use of antibiotics

and improved technics and postoperative care this mortality can be greatly reduced.

Case Report

W. P. C., a 6 months old white male infant, was admitted to Fort Sanders Hospital March 10, 1949, having been sent in for repair of a congenital right

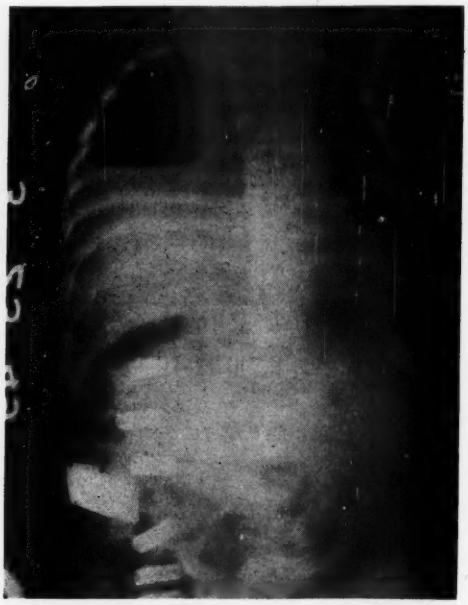

Fig. 5. Showing pleural effusion right chest 2 days after operation. Several aspirations of fluid had to be done before the patient was discharged from our care.

diaphragmatic hernia by Drs. W. R. Parks and Philip J. Begley of Harlan, Kentucky, Dr. Begley having made the diagnosis.

The patient was delivered by Cesarean section on Aug. 28, 1948, because of pelvic disproportion. The mother was not allowed to go into labor. The patient's birth weight was 6 pounds 7 ounces and he was 23 inches long. He did not breathe immediately upon delivery, although the ether anesthetic was only 22 minutes. The child continued to be cyanotic and was given coramine and other measures to stimulate breathing. It was 1 hour and 20 minutes before he breathed regularly. Flaring of the right thoracic wall was noticed at birth as well as rapid irregular and forced breathing. He was jaundiced for the first 4 days of life. Again at the age of 2 weeks there was a bout of jaundice for 3 days. Difficulty with breathing during nursing was noticed from the first, and a grunting type respiration was almost constant.

During the fourth month the patient developed enlarged inguinal and cervical lymph nodes. He was referred to a pediatrician in another city who

took a biopsy of an inguinal node, chest x-ray and complete workup. A diagnosis of pulmonary tuberculosis was made with a question of leukemia or carcinoma. He was put on large doses of streptomycin and continued to run an elevation of temperature in the afternoons sometimes as high as 102 rectally. He continued to cough and vomit but this subsided after streptomycin was discontinued. When the child returned to his home, Dr. Begley gave the child

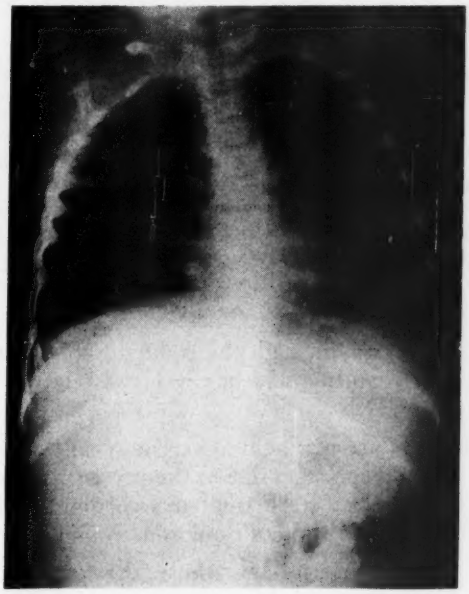

Fig. 6. Showing complete expansion of right lung and no fluid. The heart and mediastinum are now in normal position. X-ray was taken 5 months after operation. The patient had gained 8 pounds.

a barium meal and made the diagnosis of right-sided diaphragmatic hernia and referred him for surgical treatment. His weight was 12 pounds at this time.

On admission to the hospital the child was found to be under developed for his age. He showed some dyspnea and slight cyanosis after feeding. His temperature was 99.8°. There was tympany over the right chest and on careful ausculation peristalsis could be heard. Urinalysis was essentially negative except for a trace of albumen, hemoglobin 100 per cent, red blood cells 5,175,000, white blood cells 21,550 with 41 per cent neutrophiles (toxic appearance), 58 per cent lymphocytes and 1 per cent plasma cells. Further x-rays showed a dilated stomach with all of the small intestines in the right thorax except the duodenum, as well as the ascending colon, appendix and a portion of the descending colon.

On March 21 the patient was operated on. A right upper quadrant muscle splitting incision was made. There was a large diaphragmatic hernia on the right side through the foramen of Bochdalek. A large portion of the right lobe of the liver, the gallbladder, small intestines, cecum, appendix, ascending colon, transverse colon, and part of descending colon was found in the right

chest cavity. A large catheter was inserted through the hernial opening and small intestines, large intestines, and finally liver was pulled out of the chest. The hernial edges were denuded and closed by 2 layers of interrupted silk, overlapping the edges and covering over the suture line with a layer of peritoneum. The abdomen was closed with continuous silk to peritoneum, interrupted silk to the fascia and skin using 6 silk retention sutures. 200 c.c. citrated blood was given during the operation. The operation was performed under intratracheal cyclopropane and ether.

Postoperative x-rays showed complete collapse of the right lung with the mediastinum shifted to the left. 70 c.c. of air was withdrawn. He was put under an oxygen tent and put on Wangensteen suction for 3 days, fluid balance being kept with parenteral fluids.

He developed fluid in the right chest from time to time which was aspirated. The right lung gradually completely expanded and the child was discharged on April 9, 19 days postoperatively. When last seen in the office on August 23 he appeared to be a healthy infant and had gained 8 pounds, now weighing 20 pounds. His x-rays showed normal lung fields and no fluid.

SUMMARY

1. Congenital hernia through the right side of the diaphragm in children is a rare condition and has received relatively little attention in the literature.

2. These hernias are distinctly different from those occurring on the left side of the diaphragm due to the presence of the large right lobe of the liver and must be treated accordingly. Also they are distinctly different from similar conditions found in the adult.

3. These hernias, particularly those through the foramen of Bochdalek and foramen of Morgagni, should be operated on as soon as the diagnosis is made. It is believed that a number of lives will be saved by early operation.

4. Although there is some difference of opinion on the subject, the author believes the abdominal approach is the best for operation on this type of hernia.

5. A case report of a patient with a large hernia through the foramen of Bochdalek on the right side has been presented.

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SIMULTANEOUS DISLOCATION OF BOTH SHOULDERS

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THIS report is concerned with simultaneous dislocation of both shoulders, one anterior and one posterior. A review of the literature reveals this to be a rare entity. Dr. Heineck in 1924 reviewed 58 cases of bilateral shoulder dislocation and reported only one case showing posterior dislocation. Dr. Dreyer in 1929 reviewed 57 cases of bilateral dislocation and reported only 3 cases of bilateral posterior dislocation. In addition they each present one case similar to ours. This was the case reported by Pearse in 1874.

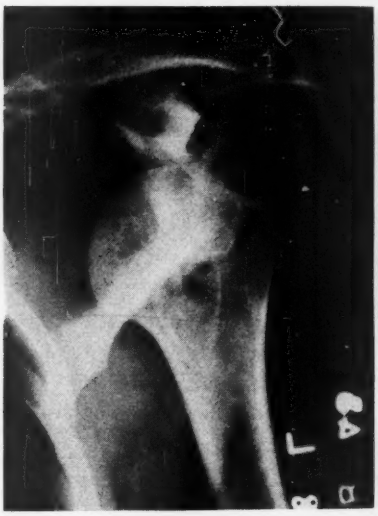

Fig. 1A—12-28-48. Anterior dislocation of the left shoulder.

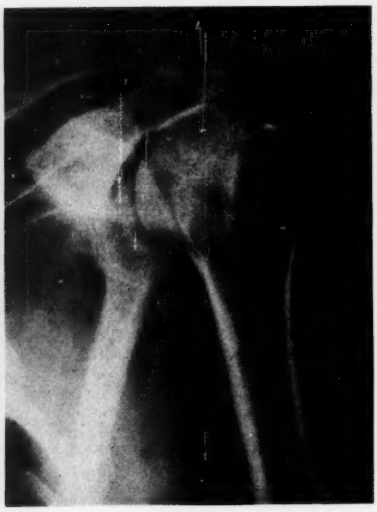

Fig. 1B—12-31-48. Reduction of the left shoulder following manipulation.

A summary of Dr. Pearse's case and our case follows:

Dr. Pearse's Case

A 72 year old male was walking downstairs with a jug of water in his right hand. He slipped and fell and, in trying to save the jug, his right arm was doubled under his chest. Examination showed the left humeral head to be lying under the coracoid process. The head of the right humerus could be easily felt on the dorsum of the scapula. The left shoulder was reduced by the "heel in axilla" method, but this was not successful on the right. By

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applying pressure on the head of the right humerus while the elbow was being drawn backwards the head suddenly snapped back into position.

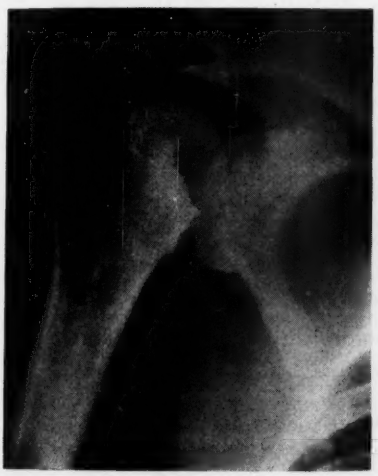

Fig. 2A — 12-28-48. This shoulder (right) was reported as normal but there is evidence of a posterior dislocation.

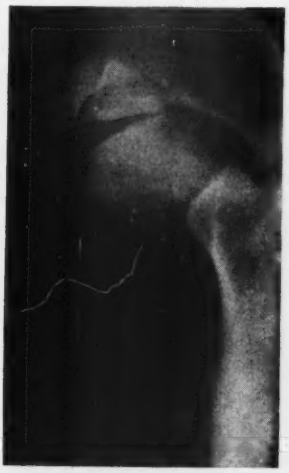

Fig. 2B—1-6-49. Lateral view of the right shoulder with obvious posterior dislocation.

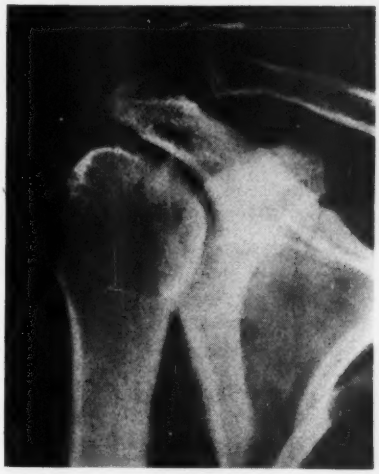

Fig. 2C—1-7-49. Reduction of the right shoulder following manipulation.

Additional Case

W. B., a 39 year old male truck driver, was admitted to the medical service with the chief complaint of pain in both shoulders. He stated that he was well until Christmas day, when, following a short nap, he awoke at about

seven p.m. with excruciating pain in both shoulders, especially the right. X-rays of both shoulders were taken and were reported as showing a dislocation of the left shoulder only (see Figs. 1A and 2A). On December 30 the left shoulder was manipulated and a Velpeau dressing applied. X-rays following manipulation showed complete reduction (Fig. 1B).

Because of persistent pain in the right shoulder, the patient was seen in consultation on January 5 by one of us (IHR). A posterior dislocation of the right shoulder was suspected and this was confirmed by a lateral x-ray view (Fig. 2B). On further questioning the patient admitted that he was drinking rather heavily on Christmas Eve and that he helped to push a friend's car. The following day he had severe pain in both shoulders. On January 6, under pentothal anesthesia, the dislocation was reduced and a Velpeau dressing applied (see Fig. 2C). His subsequent course was uneventful.

SUMMARY

An unusual case of bilateral shoulder dislocation is presented and the literature reviewed.

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ACUTE SUPPURATIVE MESENTERIC LYMPHADENITIS WITH PERITONITIS

Report of a Case

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ONLY 5 cases of acute suppurative mesenteric lymphadenitis have been reported, and none of these showed a general peritonitis or appendiceal inflammation. In the following case, acute suppurative mesenteric lymphadenitis occurred, producing a generalized peritonitis from ruptured suppurative glands.

CASE REPORT

W. N., a 5 year old white male, was admitted to Emory University Hospital on March 29, 1949. Four days before admission, he had complained of generalized abdominal pain, anorexia and sore throat. His symptoms subsided that night but recurred the following morning. The day before admission he vomited after his breakfast and his temperature, by afternoon, gradually rose to 105°. The abdominal pain and lethargy gradually increased up to admission. For the past 36 hours he had been constipated. Past history revealed severe asthma and hay fever.

At examination, the child appeared acutely ill and was listless. His cheeks were flushed; there were typical Hippocratic facies, and he had a temperature of 104° and pulse of 130. The throat was diffusely red. The abdomen was moderately distended, acutely tender in all areas, with muscle spasm, rigidity and rebound tenderness elicited in all quadrants, but more marked in the right lower quadrant. No definite abdominal mass was palpable. Rectal examination was normal. White blood cells were 19,100 with 88 per cent polymorphonuclears and 12 per cent lymphocytes. Urinalysis revealed 6-10 pus cells and an occasional red cell/hpf. The hematocrit was 35 c.c./100 c.c. of blood. The sedimentation rate fell 72 mm. in 1 hour (Westergren). Blood Kahn was reported negative. It was thought that he had a ruptured appendix with generalized peritonitis.

At operation, the abdomen was explored through a McBurney incision and on opening the peritoneal cavity, a moderate amount of muco-purulent material was seen and aspirated with suction. A culture was taken. The appendix was retrocecal and moderately inflamed but was not ruptured. Obviously, it did not explain the generalized purulent exudate. While exploring to rule out a ruptured Meckel's diverticulum, it was noted that the serosa of all loops of small bowel encountered was acutely inflamed. Further inspection revealed multiple enlarged inflamed mesenteric glands along the root of the mesentery, varying in size from 1-4 cms. The largest node was located in the mesentery of the ileum near the ileo-cecal valve. It was acutely inflamed, necrotic in the center, and was partially covered by a yellowish exudate and by the omentum. It had ruptured and drained thick yellow pus into the free peritoneal cavity. The appendix was removed, the abdominal cavity was thoroughly aspirated and 100,000 units of penicillin and 1 Gm. of streptomycin, dissolved in 10 c.c. of distilled water, were placed in the free peritoneal cavity. The

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abdomen was closed in layers without drainage. Five hundred c.c. of whole blood were given during the operation and the operative procedure was well tolerated. Immediately following the operation 100,000 units of penicillin was begun every 3 hours, streptomycin 0.5 Gm. every 6 hours, and sodium sulfadiazine 1.0 Gm. t.i.d. His temperature dropped to 100 degrees and the pulse to 90 in 24 hours, reached normal on the second postoperative day, and remained so until discharge. Streptomycin was omitted on the third postoperative day, sodium sulfadiazine was discontinued on the fourth postoperative day and the penicillin was gradually reduced and omitted on the fifth postoperative day. The wound healed by primary union and convalescence was normal and uneventful.

One week later, the white blood count was 9,350, with 41 per cent polymorphonuclears, 57 per cent lymphocytes and 2 per cent eosinophiles. The heterophile antibody test was positive 1 : 4, which was not diagnostic. The culture from the peritoneal exudate showed no growth after 24 hours. Pathological report showed an appendix of extremely small caliber with a lumen patent to the tip. Old fibrotic adhesions were present. The serosal vessels were markedly congested, but no areas of perforation were seen. The serosa appeared granular but no gross fibrinous exudate was reported. There was a break in the mucosa and a slight hemorrhagic exudate was present, in foci. The diagnosis was acute appendicitis.

The patient was discharged in good condition after 10 days in the hospital, and has remained well for 5 months.

Prior to 1920, most of the papers assumed that all of the cases of mesenteric lymphadenitis were of the tuberculous variety and that the acute process was superimposed on a tuberculous infection. Wilensky and Hahn[1] in 1920 and in 1926 called attention to a group of cases in which an acute inflammatory process manifested itself chiefly in the mesenteric glands near the ileo-cecal valve. They emphasized its frequency of occurrence and the equal frequency with which it was confused with acute appendicitis. They reported 9 cases of mesenteric lymphadenitis and suggested 4 clinical divisions, namely, Group 1, Simple mesenteric lymphadenitis; Group 2, Suppurative mesenteric lymphadenitis; Group 3, Tuberculous mesenteric lymphadenitis; Group 4, Terminal stage of mesenteric lymphadenitis (calcification). This classification, for the first time, suggested that acute mesenteric lymphadenitis could be of a nontuberculous origin. In group 2, they reported 2 suppurative cases in which a palpable tumor was felt in the right lower quadrant, which resembled an appendix abscess before operation. Each suppurative case showed an acute onset of chills, fever, and generalized abdominal pain with localization in the right side. There was little or no muscle rigidity. At operation, a normal appendix was found, there was a small excess of intra-peritoneal fluid, and the physical appearance of the intra-abdominal pathology indicated that suppuration had occurred. The mesenteric glands were matted together, with liquefaction in the center, around which there were

coils of matted small intestine. The pathological and bacteriological reports indicated that it was a pyogenic progress and not tuberculous. The postoperative course in both cases was stormy but recovery was complete.

Turberville[2], in 1928, reported 2 cases of suppurative mesenteric lymphadenitis, both of which, preoperatively, presented a palpable mass to the left of the umbilicus. At operation, both cases showed an unruptured abscessed gland between the leaves of the mesentery of the small bowel in the left abdomen. The abscess was opened and drained of free pus in each case. Both cases developed a severe wound infection, but recovered after a stormy course.

Schwartzman, Dragutsky and Rook[3] in 1941 reported a case of suppurative mesenteric lymphadenitis in a 4½ year old white male, who had inconstant right sided pain, without nausea or vomiting, for one week. There had been a cough, nasal discharge and temperature of 101 degrees for several days prior to admission. Frequent sore throats had occurred in the past. Examination showed a red throat, abdominal tenderness and rigidity, more localized over McBurney's point. Temperature 101.2, white blood count 36,000, 78 percent polys. At operation, a mass of purulent, necrotic mesenteric glands, surrounded by frank pus, was found in the cecal region, walled off by the omentum. Culture of the pus showed streptococcus hemoliticus and staphylococcus aureus. Pathological report showed chronic lymphoid appendicitis and hyperplastic lymphadenitis. A gross wound infection occurred, but the patient recovered after 5-6 weeks.

Ochsner and Murray[4] in a monograph on the acute abdomen in 1938 reported 65 cases of mesenteric adenitis, but made no mention of any of these being of the suppurative type.

Review of the records at Grady Memorial Hospital, Atlanta, Georgia, for the past 5 years revealed only 7 operated cases for mesenteric lymphadenitis. In each case the patient was explored for an acute appendicitis, and enlarged mesenteric glands were found, none of which were suppurative. In 3 of these cases, nodes were sectioned and showed chronic lymphoid hyperplasia. The pathologist reported the appendix as normal in each case. A review of the records at Emory University Hospital, Atlanta, Georgia, revealed no case of suppurative mesenteric lymphadenitis.

Discussion

The foregoing case is unusual and differs from the previously reported cases of Wilensky and Hahn[1], Turberville[2], Schwartzman, Dragutsky and Rook[3] in that it shows that suppurative mesenteric

glands may actually rupture and produce a generalized peritonitis. In this case, the glands had formed an abscess so deep and inaccessible that the omentum had been unable to cover and contain it and, as a result, frank pus drained into the free peritoneum and produced a generalized peritonitis. Since this area was more acutely inflamed than any other region, and since it was the only area to which the omentum was adhered, it suggested that the gland inflammation preceded the peritonitis. The causative organism is unknown, since the culture was reported as negative, but from the character of the pus it appeared to be staphylococcic or streptococcic or a mixture of both. The pathological report revealed acute appendicitis with no periappendicitis. This would indicate that we were dealing with primary appendicitis and not appendicitis due to irritation secondary to the peritoneal exudate. None of the previously reported cases have shown any acute involvement of the appendix.

The writer has long been impressed with the close association of upper respiratory infections with acute appendicitis. Each winter, in my experience, there is an increase in the number of cases of appendicitis occurring during the course of upper respiratory infections. It appears logical that in this case the severe throat infection may have been blood borne to the appendix and thence to the mesenteric glands with abscess formation, rupture and peritonitis.

Wilensky and Hahn[1] do not think that any appendicular inflammation precedes the mesenteric lymphadenitis, since none of their cases showed any pathology of the appendix, and since no enlargement of the mesenteric nodes occurs in severe primary inflammation of the appendix. This statement is open to question since Ochsner[4] states that in many instances, in his experience, there is an associated appendicitis, which is the cause of the mesenteric lymphadenitis. It might be argued that the suppurative mesenteric lymphadenitis followed the general peritonitis, which in turn followed the acute throat infection. However, it seems logical to assume that the peritonitis followed the gland suppuration, since there was definite evidence of a more acute process at the site of the ruptured gland than at any other point, and that the omentum was attempting to localize the infection to that area, even though the walling off was incomplete. In any event, the present case is unique in showing a definite acute inflammation of the appendix, which could have passed the infection through the lymphatics to the mesenteric glands.

A number of the previously reported cases showed extensive

wound infections. The present case healed by primary intention, and it seems definite that the antibiotics and sulfadiazine aided the dramatic recovery and rapid uneventful convalescence.

SUMMARY

A case of acute suppurative mesenteric lymphadenitis with general peritonitis is reported, a condition which has not been previously recorded. It occurred with acute but unruptured appendicitis.

Large doses of penicillin, streptomycin and sodium sulfadiazine resulted in a rapid, uneventful recovery.

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CAROTID BODY TUMORS

Case Report and Discussion

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THERE are approximately 300 cases of carotid body tumors reported. About 235 of this type of tumor and a case of our own shall be reported in this paper.

Case Report

J. B., a 28 year old colored male, was admitted to the hospital on Aug. 12, 1949, with diagnosis of branchial cleft cyst. Two years before admission patient first noticed a mass in the left neck below the angle of the mandible. The mass had gradually enlarged over the period of the past two years. He had an occasional dull ache in the region of the tumor ever since it was first observed. At times this mass seemed to get smaller. The patient became hoarse and had difficulty swallowing about two weeks before admission. He had been relatively asymptomatic otherwise. In 1941, the patient had a tonsillectomy at this hospital.

Physical examination revealed pulse 74, blood pressure 110/75, well-developed, well-nourished colored male, muscular and well-built. Examination of the pharynx revealed a bulging mass in the posterior lateral side on the left. There was a definite impairment of movement of the left vocal cord. There was a mass in the left neck that would decrease in size when pressure was applied and then would recur gradually when pressure was released, but would return to usual size suddenly upon coughing or straining. The mass was about 4x4x5 cm. It was firm but elastic. The tumor was movable in a lateral direction. There was no murmur, bruit, or adenopathy. The mass was located just anterior to and beneath the sternomastoid muscle. The remainder of the physical examination was negative, with Kahn negative. Barium swallow revealed obstruction to the flow with compression of the esophagus to the left. It was the roentgenologist's impression that the mass was extrinsic to G. I. Tract.

On Aug. 8, 1949, the patient was taken to the operating room. Under endotracheal anesthesia, an incision was made anterior to the sternomastoid muscle about 5 cm. long. The platysma was separated and the tumor exposed with blunt dissection. Much bleeding was encountered and blood loss was such that the blood pressure went down to dangerously low levels. After much dissection it was impossible to separate the tumor from the carotid vessels. The tumor had completely surrounded the internal, external and common carotid arteries, necessitating ligation and removal of the portion of these vessels within the tumor. The tumor was entirely removed. Shock was combated with whole blood transfusions. About two hours after surgery, it was observed that the patient began to have difficult and labored respira-

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tion. His temperature was recorded at 105°. In spite of nasal intubation and oxygen, it was necessary to perform a tracheotomy. This was done under local anesthetic with much relief to the patient who went into a deep sleep. Several hours later it was observed that patient had a right hemiplegia. Fever therapy, oxygen and intravenous fluids were administered and the next day the patient's temperature was normal. Two days later he was able to move his right leg; 5 days later, his right arm, and after gradual improvement he was discharged on the fifteenth postoperative day with only a weakness of entire right side.

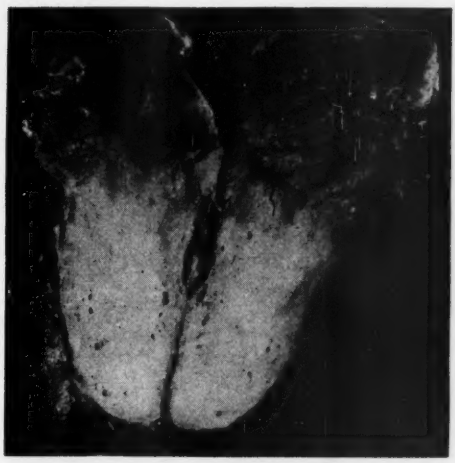

Fig. 1. Gross Appearance of Carotid Body Tumor. 1.3X. Original Kodachrome.

The patient has been followed in the out-patient clinic regularly up to the present, 2 months since surgery, and had shown continued improvement of the right hemiplegia until it is hardly noticeable. He does have a weakness of the right side and is unable to do manual labor but this is improving slowly, and he hopes to be able to return to his former job.

His neck wounds have healed well, and there is no evidence of any recurrent mass.

Gross Appearance (Fig. 1). Specimen consists of a mass, irregular in shape, measuring 6x4x2 cm. and weighing 20 Gms. The surface is gray and shaggy, and on section the cut surface is homogeneous and gray.

Microscopic Appearance (Fig. 2). Sections were taken from different areas of the tumor and were stained with hemotoxylin, azocarmin, iron HE, Papanicolaou, Shorr, with mucicarmine, and also impregnated with silver according to the method by Laidlaw. To simplify the description it was decided to describe the sections without mentioning the different pictures after the use of each stain.

The tumor represents itself to be very rich in cells, the latter being arranged in larger and smaller cell groups. The single cells composing this tumor offer more or less round or ovoid shaped nuclei with very small nucleoli or none

at all and are occupied by a very fine delicate chromatin network which accepts hemotoxylin and other basic dyes rather reluctantly. The cytoplasm accepts eosin and other acid dyes only faintly. These cell groups are separated from each other by a very fine delicate framework of collagenous fibers and connective tissue fibers which to some extent contain also numerous argentophilic fibers. These cells seem to be mature; no mitoses are noticeable. After using the Laidlaw method, the capillaries and their pericytes are well demonstrable but show no relationship whatsoever to the tumor formation. Between huge groups of tumor cells there are small groups of dark cells with

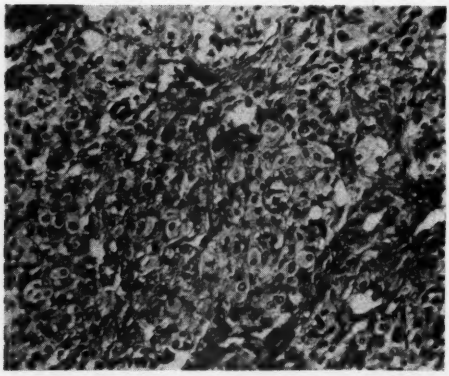

Fig. 2. Microscopic Picture of Carotid Body Tumor. 250X.

small nucleoli, heavy chromatin network, the cytoplasm of which, after application of chromaffin dyes, is somewhat brownish, but by no means do they participate in the tumor formation. The tumor is rather rich in vessels, more of the venous type. The connective tissue carries lymphocytes, plasma cells, large mononuclears. These tumor cell groups are more or less collected into larger lobules separated by heavier strands of connective tissue.

Historical Review

In 1743 Haller first described the carotid body. Confusion was born with the first concept of this structure, for Haller also described the carotid sinus at the same time. In 1880, Reigner was the first to excise a carotid body tumor which was described histologically by Marchand. In 1892, Paltauf described the perithelial cells of the carotid body. In 1895, Middleton removed the first carotid body tumor in America. In 1927, Heymans first published his discovery that respiration reflexes could be elicited from the aortic area. Later, brilliant research of this author and his associates correlated this work with the carotid body and conclusively demonstrated that this body, and the aortic area respectively, respond to chemical changes in the blood and send out impulses through the medullary center which increase respiration when there is an oxygen deficiency of the circulating blood.[1]

Embryology. According to Boyd the embryologic significance of the carotid body is found in its connection with structures of the third branchial arch. Its primordium is mesoderm of this arch, and its earliest connections are with the artery of the same arch and the ectoderm of the glossopharyngeal nerve. There is therefore, a clearly defined combination of vascular and neural elements from the outset.[2]

Histology. Carotid and aortic bodies have until recently been erroneously included with the paraganglia. They do not contain chromaffin cells and have not been shown to have an internal secretion.[3]

Microscopically, the tissue may be arranged in more or less distinct lobules. The essential or "specific" cells are arranged in whorls or clusters which are completely surrounded by a supporting stroma exceedingly rich in capillaries. The cells making up these clusters are round or polyhedral, resembling epithelium, with round or slightly ovoid nuclei containing a fine chromatin network. Their cytoplasm is abundant and may appear granular, vacuolated or reticular, depending in part upon fixation and technic. Cell boundaries are usually distinct. The presence of ganglion cells has been questioned by Hollingshead.

The supporting stroma consists of fine collagenous and reticular fibers with innumerable capillaries. The endothelial cells of the latter are so large and numerous that some may appear to be outside of the capillary lining (so-called "pericytes" by Zimmerman).

In specially prepared sections, numerous nerve fibers are found.

Thus, the principal constituent elements of the carotid body may be considered to be the "chief" or epitheliod cells making up the cells' clusters, and the neural and endothelial elements (the latter perhaps including "pericytes").*[4]

Anatomy. The carotid body is situated in close but slightly variable relation to the bifurcation of the common carotid artery, adjacent to the carotid sinus. Frequently the gland lies deep to the bifurcation; sometimes it is wedged in between the roots of the internal and external carotids; sometimes it is placed between them at a slightly higher level.

On the average its height is about 7 mm., its breadth about

*The Laidlaw stain was used to determine the relationship between the pericytes to the carotid body tumor. No definite relationship could be ascertained, in our case.

1.5-5 mm. It sometimes comprises two or more separate nodules. Its color is yellowish-grey to brownish-red.[5]

The connective tissue of the adventitia of the vessels takes part in the formation of the capsule, from which fibrous partitions penetrate into the interior of the nodule, dividing it into distinct lobules. The carotid body is thus rather firmly attached to, and sometimes partially embedded in the tunica externa of the arteries.

The carotid body is full of fine blood vessels arranged in a sinusoidal network. The supplying artery, or arteries, arise from the common carotid or its divisions. The venules drain into the internal jugular vein or its tributaries. Large lymph vessels are present. The sympathetic nerve supply comes mainly from the superior cervical ganglion and forms a dense plexus within the organ. Branches have been described coming from the vagus trunk or its pharyngeal and laryngeal rami; also from the pharyngeal branch of the glossopharyngeal and hypoglossal nerves. Nerves enter and leave at the upper pole. Myelinated and non-myelinated fibers are present as are many ganglion cells.[5]

Physiology. The carotid body is a chemoreceptor, susceptible to changes in the gaseous composition of blood and from which nerve impulses are sent to the respiratory center and thus increase the rate and depth of respiration.

In the normal physiologic process of man, this organ apparently contributes very little, but in the extreme emergency of severe anoxia (lowered oxygen tension), they become essential.

Heymans, et al., have shown that the carotid sinus region has chemical receptors and when exposed to CO_2 excess or O_2 deficiency, it responds in much the same way as the respiratory center itself, that is, it brings about an increase in respiration. In effect, it serves as a subsidiary respiratory center. The O_2 lack stimulus is in fact more effective in the carotid body than it is in the respiratory center. CO_2 action, however, is greater in the medullary center than in the carotid body.[7]

Pharmacology. The first indication that chemoreceptor reflexes were concerned in drug action was the demonstration by Heymans in 1927 that nicotine could stimulate respiration through reflexes arising in the aorta. Since then, a number of other drugs have been found to act on both the carotid and aortic bodies. Cyanides, sulfides, lobeline, potassium salts, and a variety of choline derivatives can all be shown to stimulate these end organs. As far as the mechanism of action is concerned, some facts are evident. The action of cyanide and sulfide is essentially the same as anoxia, these drugs

producing oxygen lack through paralysis of cellular respiratory enzymes. Potassium apparently is a stimulant to all nerve cells and endings in the body, and its effect on chemoreceptors is one manifestation of this property. Nicotine, lobeline, and those choline derivatives with a nicotine-like action, stimulate ganglion cells throughout the body and may stimulate similar cells believed to occur in the carotid and aortic bodies, though cytologic studies by Hollingshead indicate that "ganglion cells" are not nerve tissue, but specific "sensory cells".[8]

Pathology. Harrington, Clagett, Dockerty[9] review data concerning a group of 20 carotid body tumors for which 19 patients consulted the Mayo Clinic. One case had occurred bilaterally.

The pathologic aspects of these cases were as follows:

Grossly. 1) The tumors appeared reddish-brown, lobulated and fairly well encapsulated nodules. 2) The average size was 3.5 cm. in diameter with extremes of 2-10 cm. 3) In 4 cases the neoplasm did not appear to well encapsulated, and there was gross evidence of invasion of the surrounding tissue.[9]

Microscopically. Le Compte in a report of 17 cases subdivided the tumors into three groups.

(1) The first or usual type, included most of the cases (12 tumors), and is the variety in which there is more or less faithful reproduction of the normal structure. There was usually more variation in size and shape of the cells than in the normal gland. Mitotic figures were not observed. Generally speaking, the cell clusters of the tumors were larger than those of the normal organ, and the supporting stroma was less cellular. The general pattern is best brought out by silver impregnation of the reticulum.

(2) The second, or adenoma-like (2 tumors), show a pattern in which the chief cells have a pronounced epithelial appearance, with rounded or polyhedral shape, abundant cytoplasm, and arrangement in sheets or rows. In this type the reticulum is scanty.

(3) The third type may be called angioma-like (2 tumors). Here the cells are largely spindle shaped or crescent and apparently closely related to capillaries.

In spite of these variations, however, the fundamental pattern appeared to be the same. The structural unit consisted of a group, variable in size, of the chief or epitheliod cells, surrounded by a more or less vascular stroma. Most of the variations in microscopic appearance of the tumors seemed to be produced by differences in the shape of the chief cells.

Most striking was the persistence of the general pattern of the

reticulum in the majority of cases. Although the number of fibers and the size of the cell groups which they surrounded varied, the basic arrangement remained the same.

Concerning malignancy, in this series of cases, none of the tumors showed evidence of malignancy.[4]

However, Harrington, Clagett, and Dockerty report very definite malignancy, as shown by active mitosis, cellular variation with giant cells, and invasion of the capsule which was present in 10 of the 20 tumors in their series. However, as compared to the cells of the normal carotid body, all these tumors were composed of relatively undifferentiated cells. These authors state that it would be well on this basis to regard these neoplasms as being low grade malignant lesions possessing potential powers of, if not actual tendency toward, invasion and metastases.[8]

MacComb in a series of 10 cases of Carotid Body Tumor at Memorial Hospital in New York, states that 5 were benign and 5 were malignant.[10]

Gratiot, in a review of the literature in 1943, states that malignant manifestations such as variations in size and shape of individual cells, mitosis and invasion of the capsule and adjacent structures occur in 15-20 per cent of cases.[11]

Concerning metastases, Lahey states that local metastases to lymph nodes have been demonstrated, but distant metastases has not been verified.

Symptoms Incidence. (1) Equal as to sex

(2) No age group is exempt. The youngest case in the literature was 7 years old and the oldest 73 years. According to Bevan and McCarthy, in 70 percent of the cases the patients are from 40 to 60.

(3) Tumors occur with equal frequency on either side.

Symptomatology. (1) Tumors of the carotid body usually manifest themselves as painless, unilateral, slow growing tumors situated in the superior, anterior cervical triangle, pushing out from under the border of the sterno-cleido mastoid muscle.

(2) Because of their vascularity, they can be compressed and temporarily reduced in size.

(3) They are deep seated and never attach to the skin.

(4) They usually have lateral mobility, but since they are attached to the carotid vessels, they have little or no vertical mobility. This is very important diagnostically.

(5) Occasionally a bruit or thrill can be elicited.

(6) Compression of the carotid artery below the tumor will abolish the bruit or thrill and often will cause diminution in the size of the tumor.

(7) They are often symptomless, other than gradual increase in size.

(8) The tumor is on the average present for about 6 years before the operation.

(9) When they cause symptoms, such symptoms usually are caused by invasion or compression of important regional structures, such as the vagus nerve, sympathetic or recurrent laryngeal nerve, or the pharynx, or the esophagus.

Episodes of fainting, Adams-Stokes syndrome, hoarseness, dysphagia, cough, tinnitus aurium, and headache have been reported as being symptoms referable to tumors of the carotid body and have been attributed to compression or irritation of the vagus nerve. Horner's syndrome, exopthalmos, and mydriasis have been reported, and have been attributed to disturbances in the cervical sympathetic nerves. Local, cervical, or occipital pains have been held referable to involvement of the cervical plexus.[9]

Differential Diagnosis. The four laterally located tumors of the neck which are single, discrete, and movable in character are (1) Branchial cysts, (2) Carotid Body Tumors, (3) Single, large aberrant thyroid, and (4) Neurofibromas. They were found in Lahey's experience in about the order stated in frequency of occurrence.

The most frequent differentiation which will have to be made is between branchial cyst and carotid body tumor.

The tracts of the branchial sinus are so superficial, that in most instances, with traction upon the fistulous opening, so often at the level of the cricoid and just in front of the sterno-cleido mastoid, the branchial sinus tract can be made to stand out so that it can be readily palpated directly under the skin until it disappears under the digastric muscle to connect with the lateral pharyngeal wall in the region of the tonsil. It is for this reason that branchial cysts, forming as they do so frequently in the lower half of the tract, are so superficial in character and located as a rule, well below the level of the division of the carotid and tend as they enlarge to bulge outward upon the neck and become more and more superficial.

In contradiction to this, carotid body tumors located in the carotid notch, unlike branchial cysts, originate at a higher level and are more deeply located. As they enlarge, they do so upward,

under the angle of the jaw, and at times inward until they bulge into the pharynx and may interfere with swallowing.

The other single, laterally located tumor in this region which can be confused with carotid body tumor is a single lateral aberrant thyroid tumor. Most frequently these are multiple glandlike structures located in front of the sterno-cleido-mastoid muscle, along the course of the internal jugular vein. When multiple, the differential diagnosis is simple. When, however, they occur as a single discrete, laterally located tumor mass, they can and have been confused with a carotid body tumor. These tumors are often fairly deep in location, discrete in character, movable, and differ from carotid body tumors only in that they do not tend to enlarge upward under the jaw.

Treatment. The reader is referred to the excellent article written by Lahey and Warren in the September, 1947, edition of *Surgery, Gynecology, and Obstetrics.*

SUMMARY

1. A case of a carotid body tumor is reviewed.

2. The embryology, anatomy, and physiology of the carotid body is discussed.

3. A review of the pathology, histology, diagnosis, therapy, etc., including the literature on the subject, is presented.

4. In accordance with most of the research workers, the authors believe that these tumors should not be classified among the so-called chromaffin tumors.

5. Furthermore, the authors could not establish, at least in their case, a relationship between the neoplasm and the pericytes (Zimmerman).

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TRAUMATIC AVULSION OF THE SKIN OF THE SHAFT OF THE PENIS AND SCROTUM

Report of Four Cases

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THE loss of skin of the penis and scrotum at first thought may seem a totally incapacitating condition; however, with proper management, these patients can be repaired with some degree of restoration of function. The predominant etiological factor is trauma resulting from the accidental engagement of wearing apparel in some type of revolving machinery such as a drive shaft or flywheel. Infection has been reported as a cause, but in these cases the loss of skin is almost always confined to the penis alone. Brown[1] reported four examples of this type of infection; all of our cases, however, have been traumatic.

One persistent finding with this injury is the very minor amount of shock. Frequently the patients complain of severe pain, which is usually limited to the immediate time of the accident. Several cases have been reported in which the victim felt no pain at the time of the accident. In our complete case study no case of shock is found reported unless the patient had other injuries such as a fracture, a crushing injury to the testicle, or avulsion of the entire penis. In Case 1 below, the patient suffered the loss of both testicles and still had no evidence of shock.

Reports in the literature of this type of injury are not common. Owens[8] in 1942 published an excellent review of the literature. He found 34 cases of the loss of skin covering the penis or scrotum. In 13 cases the patient lost the skin of both the scrotum and penis. In the search of literature since 1942, one finds 19 reported cases[2-4,6,8,10-12] of the loss of the skin of penis or scrotum, and 7 of these were cases of loss of the skin of both penis and scrotum. In cases[3,6] the authors reported avulsion of the penis itself. With the 3 cases reported in this paper (Cases 1, 3, 4), this would make a total of only 23 reported cases of loss of skin from the shaft of penis and scrotum. Young[13] in a review of war injuries of the urogenital tract reported no cases similar to these.

It is very important that these injuries be repaired early. With each additional hour of delay in repair, there is an added danger of infection. As in the treatment of any traumatic wound, care should be used in cleaning and debriding the wound. After the patient has been anesthetized, tincture of green soap is used to wash the wound.

It is then irrigated with copious quantities of sterile water. In debriding the wound, extreme care should be used in debriding scrotal tissue. Roth and Warren[10] pointed out that because of the remarkable regenerative power of the scrotum, even minute pieces of tissue can be saved and used to cover the testicles. This scrotal skin will regenerate to an amazing extent and make a satisfactory covering for the testicles. Care not to debride viable scrotal skin may prevent a later plastic reconstruction of the scrotum such as was done in Case 3. However, if not even small tags of viable scrotal tissue remains, one has no alternative except to bury the testicles in their respective thighs. The main objection to this is the reported sterility that results from the increased temperature of the new environment of the testicle. This increase in temperature apparently has no effect on the hormone producing ability of the testicle. Byars[2] reports one case in which the entire scrotum was avulsed. He did not want to bury the testicle in the thigh because of the possibility of infection, so he covered the exposed testicle with a free split graft which grew well.

One problem to be considered was the form of urinary drainage to be utilized. In two cases, urinary retention catheters were used, and in two a suprapubic cystotomy was done and a retention catheter left in the wound. It was felt that the postoperative care was easier in the cases where the suprapubic drain was used. Sutton[12] did a perineal urethrotomy, but it is felt that this has no advantages over the other method.

Without injury to the corpora cavernosum, a denuded penis may be readily repaired using a free deep split graft. Where there is loss of substance of the corpora cavernosum, flap grafts from adjacent tissue may be used. Additional bulk may be added in this manner.

In cutting the free graft, a Padgett-Hood dermatome set at .015 inches was used in all cases. The advantage of the dermatome graft over a graft cut free hand lies in the more uniform thickness. The thigh was used as the donor site because it is readily accessible and one can easily obtain a graft of sufficient size. It is important that the graft be large enough to cover the shaft of the penis without patching. In 3 of our cases, there was a denuded area around the base of the penis. This was repaired by cutting a graft sufficiently large to be divided into two pieces—one piece to go around the shaft, and one piece to cover the base of the penis. A hole was cut in the graft selected to cover the base. The penis was then threaded through this hole. The graft was sutured to the denuded area around the base. The graft that is put on the shaft of the penis can then be joined to the graft around the base at one end and to

the cuff of skin which remains at the corona. This will prevent excessive contracture at the base of the penis.

Obtaining a split graft "take" on a penis is difficult for two reasons: first, one is faced with the problem of grafting onto a round surface in which the application of pressure is extremely difficult; and secondly because of the potential variation in size of the surface requiring grafting. These difficulties can be overcome by careful suturing of the graft and by making the area to be grafted as large as possible. This can be done by stretching the penis as much as possible and holding it in this position while the graft is applied. After the edges of the graft have been sutured in such a manner that the suture line on the shaft of the penis became fixed on the ventral surface, it was thought advisable to place a few sutures through the graft into the subcutaneous tissue. Interrupted sutures of fine silk were used in all cases. The cuff of foreskin around the corona should not be pulled down over the shaft of the penis as one may be tempted to do, but should be extended out over the glans so as to make the area to be grafted as large as possible. If this is not done, the end result will be a contracted and deformed penis with probable inability to copulate.

In dressing the wound, the penis should be held as near as possible in the position of erection. For this purpose a doughnut type dressing was used, made of numerous ordinary abdominal pads, the centers of which were cut out. The penis was threaded through the holes. This dressing maintained the penis extended and in the proper position and also gave some degree of pressure. In 3 cases, a fine mesh gauze impregnated with merthiolate ointment was used next to the graft, and in one case (Case 1) wet dressing of boric acid solution was used. No difference could be seen in the end result of the two types of dressings.

The postoperative care of these patients does not vary greatly from that of any patient with a traumatic injury. Our patients routinely received antibiotics postoperatively. Care should be exercised in seeing that urine does not contaminate the graft and that urinary drainage is adequate.

Immediately following an injury of this type, the patient frequently shows mental depression over his condition. It should be the responsibility of the surgeon to overcome this depression if possible. The tissue loss should be evaluated with special emphasis on the loss of the testicles and damage to the corpora cavernosum. After this, the patient and his wife should be given words of hope for the possible restoration of function of the injured parts.

Below are the case reports of our 4 cases. It is interesting to note that none of the patients had the same extent of injury. One patient (Case 2) had only the skin of the penis avulsed; while the three others had the skin of the shaft of the penis and all of the skin of scrotum avulsed. Of these three, one (Case 4) had no injury to the testicles; one (Case 3) had the right testicle torn out; and one (Case 1) had both testicles torn from their attachments.

Fig. 1. Case 1. Well healed. Note the absence of both testicles.

Fig. 2. Case 1. Well healed. Note the cuff of skin around the corona.

CASE 1. K. M., 37 year old white male. This patient was first seen about 8 hours after his injury. He backed into a flywheel on a power saw; the flywheel caught his clothes and twisted off his trousers, underwear, and shirt. It caught the scrotum and avulsed the entire skin of the scrotum. Both testicles were lost and about 90 per cent of the skin of the penis, a small cuff of foreskin being left at the corona. In addition, the skin of the pubic area for three cm. around the base of the penis was also avulsed. The perineum was lacerated into the rectum but the sphincter was not injured. There was no damage to the urethra.

The patient had been seen by a doctor in his community, given morphine, dressed, and sent on immediately for repair. On admission, the patient had no evidence of shock and complained of practically no pain. As soon as preparations could be made, the patient was given a general anesthetic and a suprapubic cystotomy was done and a mushroom catheter inserted. The perineum was closed, a drain inserted and the penis and pubic area grafted as described above.

On the fifth postoperative day, the wound was dressed and all of the graft except one small area on the left side of the penis in the suprapubic area had taken. This area later healed in. The sutures were removed on the seventh postoperative day. On the fifteenth postoperative day, the suprapubic catheter was removed, the wound closed, and the patient voided per urethra thereafter. Discharge from the hospital was delayed a few days because of the failure of

"take" of the small area described above. However, the patient was discharged from the hospital completely healed 29 days after admission.

At the present writing, the patient is beginning to show feminizing changes that would be expected following castration. Urinary function and the control of the anal sphincter are good.

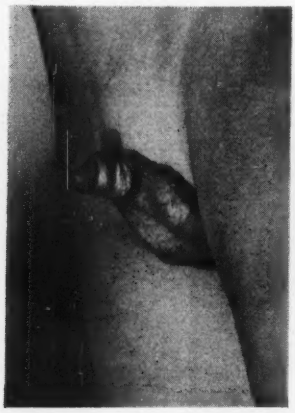

Fig. 3. Case 2. Note looseness of the skin of the shaft. The scrotum had only slight injury. The healed donor site on the right thigh can be seen.

CASE 2. T. G., 5 year old white male. This patient was first seen about 6 hours after injury. He had been riding on a tractor when he slipped onto "the engaging shaft" of the tractor. The rotary motion of the shaft caught his trousers and avulsed most of the skin of the shaft of the penis, leaving only a small cuff of foreskin at the corona. The scrotum was lacerated on the left side, exposing the left testicle. There was no damage to the urethra and no evidence of shock.

The patient was given a general anesthetic, a retention catheter was inserted and the scrotal wound was closed with introduction of a tissue drain. The shaft of the penis was grafted with the penis extended along the catheter.

On the seventh postoperative day under a general anesthetic the wound was dressed. The graft was in excellent condition, and the sutures and the urethral catheter were removed. The patient was discharged from the hospital on the ninth postoperative day. At subsequent check-ups, the penis was in good condition with no contracture. Urinary control is excellent.

CASE 3. W. C., 35 year old white male. Patient was first seen about three hours after injury. He was working on a "combine" and fell on the drive shaft. His clothes became entangled in the shaft and the rotary motion pulled off his trousers and avulsed the entire scrotum, the right testicle, and 90 per cent of the skin of the shaft of the penis, a small cuff of skin being left at the corona. In addition, the skin of the pubic area for about 4 cm. around the base of the penis was also avulsed. There was no damage to the urethra. The patient suffered severe pain at the time of injury, but on admission to the hospital showed no evidence of shock.

The patient was given a general anesthetic and a suprapubic cystotomy was done using a pigtail retention catheter. The left testicle was buried in the fat of the left thigh. The perineum was partially closed and the penis and pubic area were grafted as described above. The postoperative course was uneventful, except that the patient had a moderate temperature for three days. On the eleventh postoperative day, the patient was given a general anesthetic and the retention catheter removed and the cystotomy closed. The skin sutures were also removed at this time. On the nineteenth day, the patient was discharged from the hospital healed.

Fig. 4. Case 3. Well healed, skin soft and pliable.

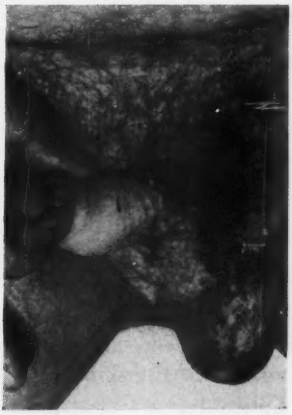

Fig. 5. Case 3. Note the reconstructed scrotum containing the left testicle. The scar on the left thigh indicates the origin of the scrotal flap. This has been repaired with a split thickness graft.

Approximately one month after discharge, the patient re-entered the hospital. At this time, a flap was taken from the left thigh including the buried testicle and an artificial scrotum was constructed. This was done in an effort to prevent sterility resulting from the increased temperature of the testicle buried in the thigh. The resulting defect on the left thigh was repaired with a split thickness graft. The patient left the hospital well healed twenty-five days postoperatively. Subsequent check-ups reveal the patient to have a good scrotum (fig. 5), normal bladder control and excellent sexual function. No pregnancy has resulted; however, he states he and his wife have used contraceptive measures since his injury.

CASE 4. H. L. S., 27 year old colored male. This patient was seen with Dr. Paul W. Hoover. He was first seen about 4 hours after injury. He fell into some revolving machinery which caught his trouser leg, pulling it off and avulsing the skin of the scrotum and about 90 per cent of the skin of the shaft of the penis and an area around the base of the penis for about 3 cm. Both testicles were undamaged and hanging free on their respective cords. In addition, the patient had an area about 8 x 5 inches on the lateral aspect of the right thigh that had been denuded also. The urethra was undamaged. The patient complained of little pain and showed no evidence of shock.

Under a general anesthetic, a retention catheter was inserted per urethra.

The testicles were buried in the fat of their respective thighs, the perineum was partially closed and the pubic area and penis were grafted as described above with the penis extended along the catheter. The area on the thigh was grafted also.

On the ninth postoperative day, the patient was dressed and the sutures removed. The retention catheter was removed on the eighteenth postoperative day. It was necessary 2 days later to replace the catheter for a few days. On the thirty-fifth postoperative day, the patient was taken to the operating room and under local anesthetic a small area on the dorsum of the penis that failed to heal was regrafted with a graft cut free hand. This graft healed well, and the patient was discharged from the hospital 44 days after admission. Subsequent check-ups reveal the patient to have a well healed penis, normal urinary control and excellent sexual function. It is too early to determine if this patient will be sterile, but it is expected that he will be. The patient was not interested in further surgery as in Case 3 to prevent sterility as long as his libido was not disturbed.

SUMMARY

Fifty-three case reports of the loss of the skin of the shaft of the penis or scrotum have been reviewed.

Three additional cases of traumatic avulsion of the skin of the shaft of the penis and the entire scrotum, and one additional case of avulsion of the skin of the penis only are reported.

The results of complete repair by the use of large sheets of skin of uniform thickness justifies the early plastic repair of these wounds.

Successful surgery of repair is in indirect proportion, from a functional standpoint, to the amount of loss of penile and testicular structures.

Tissue adjacent to the scrotum offers a satisfactory medium for the reconstruction of a scrotal sac.

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CYSTADENOMA OF THE PANCREAS

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IT IS evident, from reviewing the literature, that cystadenoma of the pancreas is not a common lesion. Young[23] reported 5 cases of pancreatic cyst, none cystadenomata, at the Massachusetts General Hospital between 1920 and 1937. Mahorner and Mattson[18] in 1931 found that of 108 cases of pancreatic cyst seen at the Mayo Clinic, there were only two cystadenomata. Adams and Nishijima[1] reported 9 cases of pancreatic cyst at the Lahey Clinic from 1926 to 1945, none of which were cystadenomata. At the University of Kansas Medical Center, in the twelve year period between 1936 and 1948, there were 7 cases of pancreatic cyst. One of these was a cystadenoma and forms the basis for the present report. Of the remaining 6 pancreatic cysts, two were pseudocysts, secondary to trauma; two were retention cysts, secondary to chronic pancreatitis, and two were retention cysts, secondary to carcinoma of the head of the pancreas with obstruction.

Müller[20] stated that there had been about 24 cases of cystadenomata of the pancreas reported up to 1926. Brunschwig[7] concluded that there had been approximately 50 cases published up to 1942, and few cases have appeared since that date. Bowers, Lord, and McSwain[5] collected four histologically proven cases in 1942, and Rabinovitch and Pines[21] presented two cases in the same year. Beloff[3] reviewed one case in 1945; Benson and Gordon[4] one case in 1947, and Jemerin and Samuels[14] one case in 1948. The present case will bring the total to approximately 60 cases.

Cystadenomata of the pancreas must be differentiated from other cystic lesions occurring in the pancreas; namely: pseudocysts, retention cysts, dysontogenetic cysts, and parasitic cysts.

Cystadenomatas are true tumors. Most authors believe that they arise from the parenchymatous tissue of the pancreas by spontaneous proliferation. (Hueper,[12] Kennard,[16] Archibald and Kaufmann,[2] Rabinovitch and Pines.[21]) Gruber (quoted by Brunschwig[7]), suggests the possibility of duct proliferation on an inflammatory basis, while other authors believe that they may be due to misplaced cells in embryonic life, and state that a cyst resembling pancreatic tissue probably originated from an abnormal enteric bud (Carter and Slattery[8]).

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Grossly, the tumors vary greatly in size, but are usually smaller than retention cysts. One of the tumors discussed by Janes[13] measured 2.5 cm. in diameter, while that reported by Kuhn, Schutz, and Helwig[17] was 22 cm. in diameter. Brunschwig[7] stated that they usually vary from 2 to 8 cm. in diameter. The tumors are usually spheroidal in shape, firm and tense in consistency and present a bosselated surface. Most are well encapsulated, and it is common to find a small bit of adherent pancreatic tissue. On cut sections, the tumors are usually multilocular, and the many small cystic spaces are surrounded by irregular bands of fibrous tissue. The majority of the cystic spaces are small, varying from a few millimeters to a few centimeters in diameter, and there may or may not be several associated larger spaces. Often a honeycomb appearance is suggested. The contents of the cysts may be clear and serous, mucinous, gelatinous or sanguineous.

Microscopically, the cysts are almost invariably lined with a single layer of epithelium that is columnar, cuboidal, or flattened. The nuclei are commonly small, round, or oval, and in the basal position. Occasionally they are larger, rod-shaped, or in the midposition. The cytoplasm is pale or clear and may be vacuolated. Considerable variation exists in various growths but the cells are usually quite uniform in any given growth. Papillary invaginations and areas of pseudostratification may or may not be present. The stroma is fibrous tissue that is usually cellular, but may be hyalinized. Foci of hemorrhage and inflammation are commonly seen, and occasional areas of calcification have been reported. Pancreatic tissue is sometimes observed in the walls of the cysts.

Pancreatic enzymes were present in the cyst fluid in several of the reported cases. Enzymes have also been obtained from retention cysts and pseudocysts, and many histologically proven cases of cystadenomata have not contained enzymes. Brunschwig,[7] Archibald, and Kaufmann,[2] state that ferments are absent in the cyst fluid.

It is frequently impossible to differentiate cystadenomatas and multilocular retention cysts. Generally, retention cysts are larger and are composed of a smaller number of larger cystic spaces, while cystadenomatas are usually composed of myriads of smaller spaces with an occasional larger one. Retention cysts may have an epithelial lining that is identical to that seen in cystadenomatas, but this is not such a constant finding, and is apt to be absent in the larger cysts (Brunschwig,[7] Jemerin and Samuels[14]). Papillary processes and pseudostratification are usually more prominent in cystadenomatas.

In many areas the epithelial lining in cystadenomatas may be so

flattened that it resembles endothelium; conversely, hyperplastic endothelium may be mistaken for epithelium. It is due to the former fact that some cases of cystadenomata have been mistakenly diagnosed as lymphangiomata (Brunschwig,[7] Jemerin and Samuels[14]). Because of the flattened lining in many areas of our tumor, it was at first diagnosed as a lymphangioma; the true nature of the tumor was revealed when special stains revealed the presence of mucus in several cystic spaces as well as within the cytoplasm of some of the lining cells. Brunschwig[7] believed that all such tumors classified as lymphangiomata were actually cystadenomata.

Cystadenoma rarely occurs in the head of the pancreas, but is seen with approximately equal frequency in the body and the tail. It usually occurs in middle life and is more commonly seen in women. Cystadenomatas, usually present between the stomach and the transverse colon, but occasionally may lie above the stomach.

The clinical picture presented by cystadenomata, is essentially that of pancreatic cysts in general, and the symptomatology may be explained in large part as due to pressure on various structures by the slowly enlarging pancreatic tumor. Commonly, a palpable epigastric mass is the presenting symptom. Pain is a common complaint, and is usually present in the epigastrium or the upper left quadrant and may radiate through to the back. Pain may be absent for a considerable period of time, as in the present case. The mass is usually round, firm, and may be nodular to palpation. It is frequently mobile, especially if attached to the body or the tail of the pancreas. Pressure on the adjacent stomach and colon may produce symptoms such as anorexia, nausea, vomiting, epigastric distress, bloating, and constipation. When the tumor is present in the head of the pancreas, some degree of biliary obstruction may occur with the production of jaundice. Diabetes of 7 years' duration was present in the case reported by Carter and Slattery.[8] Cystadenomata must be differentiated from masses in the stomach and colon, kidney tumors, localized liver enlargements, and other retroperitoneal tumors. When the tumor is large enough to produce symptoms, roentgenograms will usually reveal some degree of displacement of the stomach and transverse colon. It is impossible to differentiate between cystadenomata and other pancreatic cysts clinically.

Marsupialization and drainage of pancreatic cysts is the commonly accepted surgical treatment. Proliferative cysts, however, do not respond well to this method of treatment because of the many separate cysts in the tumor that cannot be drained. Mahorner and Mattson,[18] Speese,[22] and Hamilton,[10] report cases in which attempts to drain cystadenomatas were unsuccessful. Malignant

changes may also occasionally occur. For these reasons, whenever technically possible, complete surgical removal of the cystadenoma should be carried out.

Case Report

Mrs. G. W., a 57 year old white woman, was admitted to the University of Kansas Medical Center on June 16, 1948, with a mass in the upper abdomen that had been discovered during the course of a routine physical examination a short time before. She had not been aware of the mass, and had complained only of weakness, anorexia, and loss of five pounds of weight in the past year.

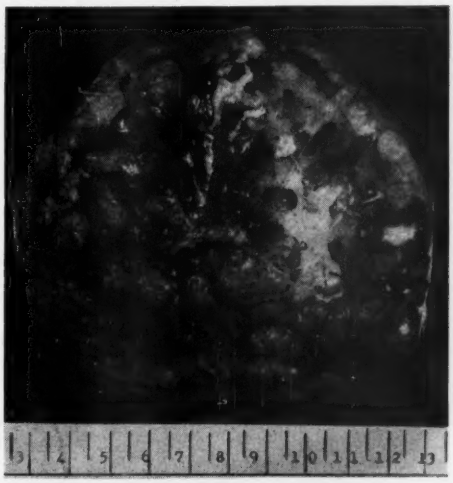

Fig. 1. Gross appearance of the tumor.

Physical Examination. The patient was a well developed, well nourished woman in apparent good health. In the epigastrium, slightly to the left of the midline, a firm rounded mass measuring approximately 12 cm. in diameter was palpated. It was not tender, was slightly movable from side to side, but did not move appreciably with respiration. The mass was believed to be retroperitoneal in position. Laboratory studies were all within normal limits. Roentgenograms following a barium meal revealed flattening of the rugal folds in the mid portion of the stomach, and a crescentic contour of the lesser curvature. Pictures taken from the lateral position revealed some anterior displacement of the stomach. The stomach emptied normally in three hours, and no abnormalities were seen in the duodenum. The preoperative diagnosis was retroperitoneal tumor, or pancreatic cyst.

The patient was explored on June 21, 1948, through a left mid-rectus incision. The mass was palpated behind the stomach and was exposed by incising the gastrocolic omentum to the left of the midcolic artery. The mass was attached to the anterior surface of the body of the pancreas, but was well encapsulated except for this attachment. Large thin walled veins covered the surface of the mass and considerable bleeding was encountered in freeing it. In freeing the mass from the pancreas no line of cleavage could be found,

so a small amount of pancreatic tissue was removed, with the mass, by sharp dissection. The cut surface of the pancreas was closed with interrupted silk sutures; a Penrose drain was placed in this area and the wound was closed in layers.

The patient's postoperative course was uneventful until the ninth day, at which time she began to have an afternoon temperature of 101°; this continued to the fifteenth postoperative day when an area, where the drain had been placed, reopened and considerable brown, watery, slightly turbid, fluid escaped. The temperature quickly returned to normal but a fistulous tract formed which continued to drain a small amount of slightly amber cloudy fluid which excoriated the surrounding skin. This irritation was controlled with a hydrojel paste. The amount of drainage gradually decreased until 12 weeks after the operation, at which time it had stopped completely and the fistulous tract was healed. The patient has remained well since the operation, the scar is well healed and pliable and she has regained her normal weight.

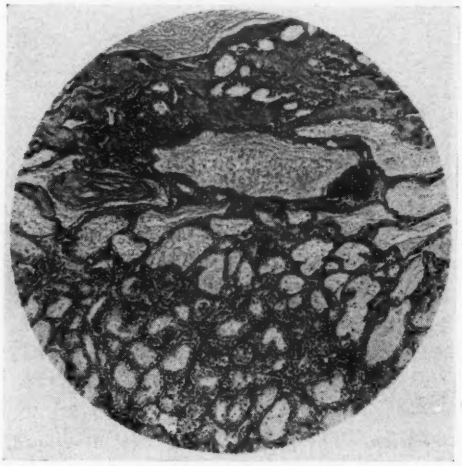

Fig. 2. X 75. Note the variation in the size of the cystic spaces as well as in the amount of connective tissue stroma.

Pathologic Report. Grossly, the specimen consisted of a tumor mass that measured 12 x 10 x 10 cm. and weighed 484 Gm. It was oval in shape, grayish-pink in color and moderately firm in consistency; it presented a lobulated surface and was surrounded with a thin fibrous capsule. A small piece of pancreatic tissue was attached to one pole of the tumor. On cut section, the tumor consisted of many small cystic spaces surrounded by a grayish-white fibrous strands. The central portion of the tumor was a white fibrous core, with irregular bands of fibrous tissue radiating to the periphery. Many small cystic spaces contained mucoid material, and had a honeycomb appearance. The majority of the cysts were small and measured approximately one millimeter in diameter. The cysts on the surface were somewhat larger and measured from 4 to 10 mm. in diameter. The walls of the cysts were thin, and the inner surfaces were smooth.

Histologically, the cystic spaces were lined with a single layer of low columnar to cuboidal epithelial cells, with clear cytoplasm and small, round, dark staining, centrally placed nuclei. The larger spaces were lined with flattened epithelial cells. Areas of pseudostratification were frequently seen, and there was some suggestion of invagination into the lumena, although definite papillary folds were not seen. The epithelial lining was desquamated in some areas. Many of the cystic spaces contained granular, pink staining material. The stroma was fibrous throughout and was generally rather acellular. In some areas hyalinization was seen, while other areas presented a looser architecture, suggesting stromal edema and some mucoid degeneration. Occasional foci of hemorrhage and inflammatory cell infiltration were seen. The capsule was intact and the epithelial cells were uniform throughout. The pancreatic tissue consisted of closely packed acini that showed considerable cloudy swelling. There was some increase of intralobular fibrous tissue, and the pancreatic ducts were slightly dilated. The pancreatic tissue was separated from the tumor tissue by a thin band of fibrous tissue.

Sections stained with the toluidine blue and the mucicarmine stains demonstrated the presence of mucus within some of the epithelial lined spaces, as well as within the cytoplasm of some of the lining cells.

Diagnosis

Cystadenoma of the pancreas.

Summary

A case of cystadenoma of the pancreas is presented. Complete surgical extirpation was followed by a pancreatic fistula which healed spontaneously.

It is estimated that approximately 60 cases of cystadenomata of the pancreas have been reported to date.

The pathogenesis, differential diagnosis, clinical features, treatment, and pathology are discussed briefly.

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SPLENECTOMY: INDICATIONS AND RESULTS

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THE hematologic and physiologic aspects of the spleen have been studied by numerous investigators, and still controversial issues are frequent, the pathogenesis of some disorders not clear, and the diagnosis of the cause of splenomegaly at times extremely difficult. From the standpoint of the surgeon, however, certain indications and contraindications for splenectomy have been evolved. Without detailed discussion of the debatable and undetermined aspects of splenomegaly, 50 cases of splenectomy at this institution during the past 8 years will be presented.

Reznikoff[1] has classified abnormalities and disease involving the spleen from a surgical viewpoint as shown in Table 1. Whereas certain modifications may be justifiable, this classification forms an excellent basis for a discussion of splenectomy. In this series, most cases fall fairly well into Reznikoff's classification, but as Andrus and Holman[2] stated "diagnostic categories cannot be entirely fixed and some borderline cases, or others in which the diagnosis is not entirely clear, are to be found in any series."

The relative frequency of the reasons for splenectomy, as collected from eight series, are shown in Table 2. In the present group no splenectomies were performed for anomalies of position (splenectomies for this disorder were summarized by Bohrer[3]), hemangioma (summarized by Hodge and Wilson[4]) or aneurysm of the splenic artery (summarized by Machemer and Fruge[5]). The four most frequent and definite indications for splenectomy are traumatic rupture, spherocytic jaundice, thrombocytopenic purpura, and Banti's syndrome.

Traumatic Rupture: A history of trauma with local pain at the site of injury is usually obtained. Abdominal pain follows and this is localized in the left upper quadrant or generalized. Radiation of the pain to the left shoulder (Kehr's sign) with or without accentuation on inspiration may be present. Weakness, nausea, and vomiting are fairly common symptoms. Shock with its usual symptoms occurs when the bleeding is severe enough. Examination may reveal contusions, tenderness and other signs of injury over the left side

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TABLE 1

Indications for Splenectomy

Modified from Reznikoff[1]

A. Decided Value
1. Traumatic rupture
2. Anomalies of position
3. Spherocytic jaundice
4. Thrombocytopenic purpura
5. Banti's syndrome
6. Abscess
7. Cysts and hemangiomas
8. Neoplasms
9. Splenic neutropenia
10. Panhematocytopenia
11. Aneurysm of splenic artery
12. Large spleen with mechanical distress and removal not contraindicated

B. Possible Value
1. Gaucher's disease
2. Erythroblastic anemia
3. Sickle cell anemia
4. Cirrhosis of liver
5. Tuberculosis

C. Little or no value
1. Syphilis
2. Amyloidosis
3. Kala-azar
4. Malaria
5. Schistosomiasis
6. Polycythemia vera
7. Leukemia
8. Hodgkin's disease
9. Hemachromatosis
10. Anomalies
11. Other diseases

TABLE 2

Eight Series of Splenectomy

	A	B	C	D	E	F	G	H	Total
Traumatic rupture	14	3	..	..	..	6	..	4	27
Spherocytic jaundice	233	53	17	20	30	1	11	7	372
Thrombocytopenic purpura	153	33	12	17	22	2	3	5	247
Banti's syndrome	272	33	8	25	61	3	15	4	421
Acquired hemolytic anemia	..	4	..	6	7	..	..	8	25
Atypical purpura hemorrhagica	..	..	2	..	11	..	..	3	16
Panhematocytopenia	..	6	..	7	..	..	..	2	15
Cyst of spleen	..	..	..	4	..	1	..	1	6
Syphilitic splenomegaly	13	1	..	..	..	..	..	..	14
Hypoplastic anemia	..	13	3	..	..	..	..	..	16
Reticulum cell sarcoma	..	..	1	..	..	..	..	1	2
Leukemia	46	11	..	..	..	..	1	1	59
Pernicious anemia	62	..	..	..	..	..	18	..	80
Hodgkin's disease	..	5	..	..	..	2	..	..	7
Miscellaneous	210	16	7	4	0	0	6	14	257

A summary indicating the frequency of causes for splenectomy, as collected from the literature.

A. Pemberton and Kiernan
B. Curtis and Movitz
C. Andrus
D. Lahey and Norcross
E. Whipple
F. Pugh
G. Hanrahan and Vincent
H. Williams et al.

of the chest and abdomen. Abdominal tenderness with increased muscle tone and rebound tenderness are usually elicited. Persistent dullness in the left flank with shifting dullness on the right side (Ballance's sign) will be found if an appreciable amount of blood is present in the peritoneal cavity. Percussion may show the left diaphragm to be high. Shock may be present. Anemia and leukocytosis indicate to some extent the severity of the bleeding. Microscopic hematuria is not infrequent, due to concomitant injury to the left kidney. An x-ray of the abdomen may demonstrate increased density in the left upper quadrant, elevated left diaphragm, displacement of the stomach to the right, and fluid between the loops of the small intestine (Webb's sign). The fundus of the stomach may be displaced downward, with serrations on the greater curvature (Solis-Cohen and Levine[6]). It is generally agreed that immediate operation is imperative for traumatic rupture of the spleen.

The symptoms of traumatic rupture of the spleen may be delayed for days or weeks, infrequently even for months (Zabinski and Harkins[7]). This has been described as delayed rupture of the spleen, a misnomer which is very misleading; since the rupture occurs at the time of the injury, but the onset of the typical clinical picture is delayed until secondary hemorrhage occurs.

Zabinski and Harkins found the mortality rate for untreated splenic rupture to range from 77 to 100 per cent. Pugh,[8] in reviewing the literature, found since 1900 reports of 9 to 47 per cent mortality for operation in ruptured spleen. The four patients in this series recovered.

Spherocytic Jaundice: In spherocytic or congenital hemolytic jaundice, the history usually reveals another member of the family similarly afflicted. Weakness and recurrent jaundice are the principal symptoms. The anemia may be further manifested by increased fatigability and exertional dyspnea. Vague upper abdominal pain due to the enlarged spleen may occur, or the predominant symptoms may be referable to the biliary tract (pigmented gallstones occur in 70 per cent of the cases). Chronic leg ulcers may be present. Hemolytic crisis may come on spontaneously or be precipitated by a minor infection or similar insult. In a crisis, the patient is acutely ill with fever, abdominal pain, nausea, and vomiting accompanied by weakness and jaundice. The signs are anemia, jaundice, and in 85 per cent of the cases splenomegaly (Andrus and Holman). The anemia is normochromic or hyperchromic. The reticulocytes are increased. The small, dense, brownish red cells seen in the peripheral blood smear are spherocytes; and spherocytosis can be proved by finding the biphasic Price-Jones curve on cell

measurement, the increase between four and six micra representing the sphereocytes and that between eight and nine micra the reticulocytes. The mean cell thickness is increased due to the globular shape of the cell. Further evidence of this obtained by the increased fragility to solutions of hypotonic saline. Increased hemolysis is manifested by a positive indirect Van den Bergh reaction, bilirubinemia, urobilin in the urine and increased urobilin in the stool. Bone marrow studies show hyperplasia of the erythroid series.

TABLE 3

Spherocytic Jaundice

Author	Number Cases	Hospital Deaths	Late Deaths	Lost	Living		
					Excellent	Good	Poor
Pemberton	118	4	11	5	82	12	4
Thompson	30	3	3	1	23	0	0
Andrus and Holman	17	0	2	0	14	1	0
Lahey	20	0	0	0	18	2	0
Sharpe	13	0	0	0	13	0	0
Total	198	7	16	6	150	15	4
Percentage	100	3.5	8.1	3.0	75.8	7.6	2.0

The results in five reported series of splenectomy for spherocytic jaundice.

Splenectomy is definitely indicated for spherocytic jaundice. The excessive hemolysis stops with subsequent relief of the anemia and jaundice. Spherocytosis with increased fragility persists. In 198 cases collected from the literature (Table 3), 75.8 per cent had excellent results, with a hospital mortality rate of 3.5 per cent. Pemberton and Kiernan[9] in the most recent Mayo Clinic report had 233 cases of spherocytic jaundice with seven hospital deaths. In 162 cases traced five years or more, there were 18 late deaths. In the seven cases in this series, one hospital death occurred and six patients had excellent results.

A related but less well-defined group of patients are those with acquired hemolytic anemia. The cause is usually not determined; the family history is negative, spherocytosis is absent, and the spleen is enlarged. Eight patients in this series had either acute or chronic hemolytic anemia. After splenectomy, there were two hospital deaths, two late deaths, and three still living who have had poor results. One patient was lost to follow-up. In the same category, Dameshek and Schwartz[10] have reported ten patients treated by splenectomy with four operative deaths, two relapses, and four complete recoveries. A recent personal communication from Da-

meshek increases the number in this group to 32 cases with 15 excellent end results.

Thrombocytopenic Purpura: Idiopathic thrombocytopenic purpura occurs in an acute or chronic form. The patient may note increased ease of bruising for many years. Occasional bleeding from the gums or unexplained petechiae occur. In the acute form, sudden and severe hemorrhage may take place into any tissue or from any mucous membrane. Intractable menorrhagia, hematuria, or melena develop and large ecchymoses or hematomas form. Pallor will be found if the bleeding has been sufficiently severe. In children, this disorder is most frequent in the male, usually acute and tends to remit spontaneously. Conversely, in adults, it is more often seen in women, is chronic, and does not remit without treatment (Elliott[11]). On examination ecchymoses, petechiae, and hematomas will be evident. The gums may be crusted with blood. Severe uterine bleeding may be found. The spleen is infrequently palpable. The laboratory findings show a thrombocytopenia, usually with less than 100,000 platelets per cubic millimeter of blood. The clotting time is normal or slightly prolonged. The bleeding time is increased. There is poor clot retraction with the formation of a friable clot. Capillary fragility is increased, which has been repeatedly emphasized as of value in differential diagnosis. Leukocytosis and anemia may be present. The bone marrow shows adequate or excessive mature megakaryocytes, an important point to determine preoperatively.

TABLE 4

Thrombocytopenic Purpura

Author	Number Cases	Hospital Deaths	Late Deaths	Lost	Living		
					Excellent	Good	Poor
Pemberton	41	2	0	0	36	2	1
Elliott	21	0	2	0	18	1	0
Andrus and Holman	12	0	1	0	11	0	0
Lahey	17	0	0	0	14	0	3
McLean et al.	6	3	0	0	3	0	0
Rosenthal	43	4	7	0	29	3	0
Eliason and Ferguson	5	0	0	1	4	0	0
Eliason and Ferguson (from literature)	213	28	N.S.	6	156	17	6
Total	358	37	10	7	271	23	10
Percentage	100	10.3	2.8	2.0	75.7	6.4	2.8

Results in eight reported series of splenectomy for thrombocytopenic purpura.

The almost immediate cessation of bleeding following splenectomy is well known. From the literature (Table 4), 358 cases have resulted in 75.7 excellent results with a hospital mortality rate of 10.3 per cent. Pemberton and Kiernan had 153 cases; there were nine hospital deaths and 82 patients traced five years or more with 11 late deaths. No deaths occurred in the five patients in this series; four patients had excellent results, while one was lost to follow up.

Another group of patients with similar history and physical findings have been called atypical purpura hemorrhagica. The exact cause is usually not established, platelets may or may not be decreased and splenectomy is far less effective, although occasionally a good result will be obtained. Three patients in this series were diagnosed as atypical purpura hemorrhagica. Two operative deaths occurred, and the third patient is living and fairly well.

Banti's Syndrome: Since the early papers by Banti,[12] this category has included a large group of young patients with anemia, leukopenia, and splenomegaly. Principally through the efforts of Whipple[13] and his coworkers, a better understanding of this syndrome has been evolved. The underlying lesion is apparently a portal-bed block with resultant portal hypertension. The following classification of portal hypertension has recently been suggested by Linton, Hardy and Volwiler.[14]

I. Intrahepatic:
   A. Portal cirrhosis (Laennec) with or without cavernomamatous transformation of the portal vein.
   B. Thrombisis of the hepatic veins.

II. Extrahepatic: (Banti's syndrome)
   A. Congenital: obliteration of the portal vein with cavernomatous transformation.
   B. Acquired: thrombosis of the portal vein or its tributaries.
      1. Infectious
      2. Traumatic
      3. Spontaneous.

III. Combined type: portal cirrhosis with portal vein thrombosis.

The symptomatology includes weakness, increased fatigability, digestive disturbances, and hematemesis. The spleen is enlarged and firm. Pallor is present and in advanced cases jaundice and ascites may be evident. Hypochromic anemia, leukopenia, and moderate thrombocytopenia are found. Decreased fragility to solutions

of hypotonic saline may be present. Liver function tests may reveal hepatic damage in the intrahepatic type. Fluoroscopy, during barium swallowing, may demonstrate esophageal varices. Reznikoff states "the diagnosis depends upon eliminating other causes of splenomegaly."

TABLE 5

Banti's Syndrome

Author	Number Cases	Hospital Deaths	Late Deaths	Lost	Living		
					Excellent	Good	Poor
Pemberton	164	16	68	0	63	11	6
Russelot	55	8	13	0	31	0	3
Andrus and Holman	8	0	1	0	5	0	2
Lahey	25	2	0	0	20	0	3
Howells	51	9	17	0	20	0	5
Barg and Dulin...	22	8	4	2	4	2	2
Total	325	43	103	2	143	13	21
Percentage	100	13.3	31.7	0.6	44.0	4.0	6.4

The results in six reported series of splenectomy for Banti's syndrome.

In 325 cases from the literature (Table 5) treated by splenectomy 44 per cent obtained an excellent result. The hospital deaths were 13.3 per cent and later deaths for varying periods of follow-up 31.7 per cent. Pemberton and Kiernan had 272 cases with 29 hospital deaths, 14 of which were due to thrombosis of the portal vein or its tributaries; 116 subsequent deaths occurred; 208 had been traced five years or more with 114 (54.8 per cent) living at that time. In this series of four splenectomies for Banti's syndrome, there was one excellent result and 3 late deaths. The most frequent causes of death shortly after operation have been gastrointestinal hemorrhages, mesenteric or portal vein thrombosis, and hepatic failure. Late deaths have most often been due to hemorrhage from esophageal varices or cirrhosis of the liver.

As the results following splenectomy have not been entirely satisfactory, and based upon a better knowledge of the cause, a shunting procedure to decrease the hypertension in the portal system has been suggested. Whipple, Blakemore, and Lord[15] first reported on splenorenal or portcaval shunts; and Blakemore[16] has recently summarized their experiences with 58 patients. There were 11 (19 per cent) operative deaths. Of the 35 patients who had had hematemesis preoperatively, 11 had one or more episodes of bleeding after leaving the hospital. Linton, Hardy, and Volwiler[14] reported 15

cases from the Massachusetts General Hospital. In the intrahepatic type, two of seven patients were living. For the extrahepatic type all eight patients subjected to a shunt operation were still living from five to 22 months postoperatively; only one had bled. It is readily apparent that in carefully selected patients, portacaval or splenorenal shunts may result in the relief of symptoms, and the prolongation of life to a much greater degree than that offered by other procedures such as splenectomy, the injection of esophageal varices, omentopexy, or resection of the lower esophagus and cardia.

Miscellaneous Conditions: McClure and Altmeier[17] collected from the literature 148 cases of cyst of the spleen and added one of their own. In this series one cyst of the spleen was removed.

CASE 1. A white man, aged 25, was admitted March 13, 1946, because of vague left upper quadrant pain. His physician had told him that his spleen was enlarged eight years previously. Examination showed the spleen 4 cm. below the left costal margin. Laboratory findings were within normal limits. Splenectomy was performed March 20, followed by an uneventful convalescence. When last seen Dec. 6, 1948, he had been asymptomatic, examination was not remarkable, and the blood findings normal. Pathologic diagnosis: simple unilocular cyst of the spleen.

One instance of cystic lymphangiectasia of the spleen occurred in this series:

CASE 2. A 74 year old white man was admitted on Jan. 12, 1944, because his physician had found the spleen to be enlarged on routine examination eight months earlier. Slight nausea was his only symptom. Examination showed slight hypertension, generalized arteriosclerosis, and the spleen extended 15 cm. below the left costal margin. Laboratory findings showed hemoglobin 13.1 Gm. but were otherwise normal. Splenectomy on January 17 was followed by a smooth recovery. The patient expired Oct. 13, 1944, of a cerebrovascular accident following operative fixation of a fractured hip. Pathologic diagnosis: Cystic lymphangiectasia of the spleen (weight of spleen 950 Gm.).

One patient in this series had a reticulum cell sarcoma. As it is now nearly eight years since operation, the possibility of cure seems fairly good. Primary tumors of the spleen are relatively rare but occasionally one may be removed while still confined to that organ. On this basis Lahey and Norcross[18] have suggested that if no cause for an enlarged spleen can be found during a period of several months' observation with repeated hematologic studies, splenectomy may be indicated.

CASE 3. A 12 year old white boy was admitted March 18, 1941, because of left upper quadrant pain for one year. Occasional vomiting had occurred and he had lost ten pounds in six months. Examination showed a large, smooth, slightly tender, left upper quadrant mass with a notch on the medial

border. The hemoglobin was 11.0 Gm., red blood cell count 4.5 million, white blood cell count 6,200, with a normal differential. Splenectomy was performed April 12, and his recovery was uneventful. When last seen Nov. 8, 1948, he had no symptoms and there was no evidence of recurrence. The blood picture was normal except for a white blood count of 10,650. Pathologic diagnosis: reticulum cell sarcoma (weight of spleen 1530 Gm.).

Armstrong, Tragerman, Adams, and Townsend[19] found 51 cases of the Cruveilhier-Baumgarten syndrome in the literature, and added two cases of their own. Valk and Horne[20] previously reported in detail the case from this series and only a brief abstract will be given. The syndrome consists of portal hypertension, splenomegaly, and patent umbilical vein. Clinically it is characterized by splenomegaly, without hepatomegaly, distended abdominal varices, abdominal venous thrill and murmur and persistent leukopenia.

CASE 4. A 20 year old white man was admitted March 7, 1942, because of diarrhea of six weeks' duration. The spleen was firm, non-tender, and extended down to the left iliac crest. A thrill was palpable and a murmur audible just to the right of the umbilicus, extending upward toward the liver, and disappearing with light pressure. The hemoglobin was 12.0 Gm., the red cell count 4.7 million, white cell count 3,200, with 50 per cent segmented neutrophiles, 8 per cent non-segmented neutrophiles, 6 per cent eosinophiles, 32 per cent lymphocytes, 4 per cent monocytes, and platelet count of 160,000. Bleeding and clotting time were normal. Bone marrow aspiration and removal of a lymph node showed nothing abnormal on microscopic study. Splenectomy was performed March 31, 1942. His recovery was uncomplicated but the thrill and murmur were still present upon discharge. When last seen Nov. 9, 1948, he had progressed exceedingly well. Examination was not remarkable; the thrill and murmur had disappeared. Hemoglobin was 11.9 Gm., red blood cell count 3,185,000, white blood cell count 10,400, with 66 per cent neutrophiles, 23 lymphocytes, 8 per cent monocytes, and 3 per cent eosinophiles. Platelet count was 404,000. Pathologic diagnosis: Spleen showed diffuse fibrosis, prominent blood spaces, and numerous eosinophiles. Compatible with Cruveilhier-Baumgarten syndrome (weight of spleen 1700 Gm.).

Doan[21] first described splenic panhematocytopenia. Curtis and Movitz,[22] and Lahey and Norcross[18] include cases of this disorder in their series. Anemia, leukopenia and thrombocytopenia with prompt relief following splenectomy are the characteristic findings and course. The bone marrow shows hyperplasia of all series. Two such patients were found in this series and both had excellent results.

Wiseman and Doan[23] also called attention to splenic neutropenia; and Palumbo[24] has recently discussed this problem, stating that it constitutes an important indication for splenectomy. Wiseman and Doan give the characteristics of primary splenic neutropenia as follows: Splenomegaly with occasional purpura, oral ulceration or icterus; in the bone marrow hyperplasia of the myeloid series

with no abnormal cells and not the cells found in leukemia; in the blood marked specific neutropenia, anemia when present is macrocytic and hyperchromic, reticulocytosis if there is anemia, and variable thrombocytopenia. One such patient in this series died shortly after operation.

Five patients in this series had an undiagnosed type of blood dyscrasia with splenomegaly prior to operation. One patient, subsequently classified as malignant lymphoma, has developed typical lymphatic leukemia since splenectomy three years ago and is now receiving x-ray therapy at another hospital. A second patient, operated upon two years ago, and now moved to another state, writes that she is now under treatment for leukemia. Detailed information has not been obtained. Apparently in both these patients with borderline indications for splenectomy, the disease process has not been made more severe.

Another one of these five patients developed severe hyperthyroidism a year after splenectomy. His bleeding tendency had persisted, and he expired after thyroidectomy. Autopsy showed acute suppurative pancreatitis and hemorrhage into the neck and mediastinum. Pseudohemophilia or a megakaryocytic leukemia were considered as possible diagnoses.

The fourth patient had esophageal varices and splenic fibrosis but the blood picture was not in keeping with a diagnosis of Banti's syndrome. She expired a year after splenectomy. No autopsy was done.

The fifth patient had several bouts of hemoptysis over a period of two years. No cause could be found. The spleen was enlarged and the blood findings normal. Splenectomy was performed nearly eight years ago, and she has since coughed up small amounts of blood on a few occasions. Blood smear now shows many giant platelets and one nucleated red cell per 200 white cells but is otherwise normal.

Seven of the 50 splenectomies were performed as incidental procedures during operations on the stomach, colon or pancreas.

Contraindications: Lahey and Norcross list the following contraindications to splenectomy: agnogenic myeloid metaplasia, leukemia, lymphoblastoma, polycythemia vera, infections, Cooley's anemia, sickle cell anemia, and paroxysmal nocturnal hemoglobinuria. The first of these should be emphasized as removal of the spleen will result in death. In agnogenic myeloid metaplasia, the bone marrow hematopoesis has been lost due to some process such as toxic effect, malignant invasion, sclerosis, or other disease. The

spleen is then the principal blood forming organ and is essential to maintain life.

Operation: Eight of the 50 splenectomies were performed through the transthoracic approach. Carter[25] has recently demonstrated the usefulness of combined abdominothoracic approach on the left for splenectomy, and Blakemore[16] mentions the use of a similar approach on the right for portacaval anastomosis. Exposure is excellent and the procedure no more shocking than the usual abdominal approach. In those with a perisplenitis the vascular adhesions posteriorly can be divided under direct vision. The transthoracic approach has the disadvantage of limiting the extent of the exploration for an accessory spleen. Curtis and Movitz[22] have emphasized the frequency and the importance of the accessory spleen in the various types of hypersplenism.

TABLE 6

Fifty Splenectomies in This Series

	Number Cases	Hospital Deaths	Late Deaths	Lost	Living		
					Excellent	Good	Poor
Traumatic rupture.	4	..	..	..	4	..	..
Spherocytic jaundice	7	1	..	..	6	..	..
Thrombocytopenic purpura	5	..	..	1	4	..	..
Banti's syndrome ..	4	..	3	..	1	..	..
Atypical purpura hemorrhagia	3	2	..	..	..	1	..
Acquired hemolytic anemia	8	2	2	1	..	..	3
Panhematocytopenia	2	..	..	..	2	..	..
Splenic neutropenia	1	1	..	..	..	..	..
Cyst of spleen.....	1	..	..	..	1	..	..
Malignant lymphoma	1	..	..	..	..	..	1
Cystic lymphangectasia	1	..	1	..	..	..	..
Creuvilhier-Baumgarten syndrome.	1	..	..	..	1	..	..
Reticulum cell sarcoma	1	..	..	..	1	..	..
Leukemia	1	..	..	1	..	..	..
Miscellaneous	10	1	4	0	3	1	1
Total	50	7	10	3	23	2	5
Percentage	100	14	20	6	46	4	10

The results in fifty splenectomies in this series.

It has been noted by a number of observers that following splenectomy, a low-grade fever which cannot be explained may persist for 8 to 10 days. Wangensteen[26] recently stated that Baronofsky has found after splenectomy and gastric resection considerable drainage high in amylase if a drain is inserted. Such an accumulation in an undrained case might well explain this fever.

SUMMARY

Fifty cases of splenectomy have been reviewed and the results noted (Table 6). The results for the more frequent disorders for which splenectomy has been performed are compared with several series from the literature. The most satisfactory results may be expected in traumatic rupture, spherocytic jaundice, idiopathic thrombocytopenic purpura, and panhematocytopenia due to hypersplenism. Fair results are obtained in Banti's syndrome but the reports of the further course of those patients having shunt procedures is awaited with interest.

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MULTIPLE FRACTURES IN THE SAME PATIENT

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ALTHOUGH multiple fractures are becoming much more frequent because of the increasing number of automobile, airplane, and industrial accidents, there have been very few articles written on the subject. Until recent years, the victims of such accidents usually died at the time of the injury; whereas now, because of better care, many of them survive and require definitive treatment. The decisions as to the immediate care of these patients, the priority of treatment of the fractures, and the compromises that must be made between the various injuries, call for much more ingenuity than is required to treat a single fracture.

In the past two years, we have observed 116 patients with multiple fractures which involved the various bones in this order of frequency:

Lower Extremity		Upper Extremity	
Tibia	40	Ulna	25
Femur	34	Radius	24
Fibula	30	Humerus	20
Ankle & Foot	20	Wrist & Hand	18
Patella	6		
Trunk		**Shoulder Girdle**	
Pelvis	22	Clavicle	15
Spine	17	Upper Ribs	12
		Scapula	4

In these 287 fractures in 116 patients, the lower extremity was most often injured, while the bones of the trunk and shoulder girdle suffered less than either extremity. Fifty-five of the 116 patients suffered one or more compound fractures, which is not surprising in view of the severity of the accidents that produced the multiple injuries. Our conclusions as to treatment are based on this varied group of cases.

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First Aid in Multiple Fractures

A patient with multiple fractures usually needs a large dose of morphine to relieve the pain. Then the spine and all four extremities should be palpated for evidence of swelling or tenderness. If the patient is intoxicated or unconscious, bruises, swelling or deformities may indicate the presence of fractures. Less obvious fractures or dislocations may be overlooked if the pain of the major fracture is intense. All injured extremities should be splinted before the patient is moved. If the spine is tender, the patient must be kept lying flat while he is being transported to the hospital. If there is no head injury and the patient shows evidence of beginning shock, the head should be lowered. The patient must be protected against exposure, and all extremities must be carefully supported while he is being lifted onto a stretcher.

Initial Treatment of Multiple Fractures

First in order of importance is the treatment, or rather the prevention, of shock. A patient who has suffered multiple fractures also has multiple soft tissue injuries which increase the danger of shock. Blood, plasma, and other stimulants should be given immediately upon arrival of the patient at the hospital.

Second in order of importance is the treatment of compound fractures and lacerations. All wounds should be thoroughly cleaned and sutured loosely. If several hours have elapsed or if there is gross contamination, the wounds should be cleansed and packed open or prepared for secondary closure five to ten days later. The patient should be given antitetanus serum, penicillin, or other antibiotics.

Third in order of importance is the prompt reduction of all dislocations and fractures to prevent circulatory damage and further shock. Skeletal traction and manipulation with morphine or pentothal anesthesia is advisable unless severe head injuries make it unsafe.

If there are lacerations or fractures in the arm or thigh, a tourniquet cannot be used. Lacerations also may prevent the use of skeletal traction in the skull or extremities. Fractures of the ribs or jaw may make it impossible to use inhalation anesthetic, and bloody spinal fluid is a contraindication to the use of spinal anesthetic.

Fractures of the maxilla or mandible, when associated with other fractures, can be treated temporarily with ice bags until the danger of nausea and vomiting is past. If there are dislocations or gross

deformities of the jaw, they must be reduced immediately and a head bandage applied.

Fractures and dislocations of the cervical spine, with other injuries, must have immediate attention with traction to the skull or manipulation under anesthetic if there is marked displacement.

Fractures of the thoracic or lumbar spine, with associated fractures, can be treated temporarily by placing the patient flat on a stiff bed or in a plaster shell. Subsequent hyperextension with morphine sedation will complete the correction of the vertebral deformities.

Most *fractures of the shoulder girdle* are best treated by keeping the patient flat in bed. However, if there is an accompanying fracture of the shaft of the humerus, a hanging cast cannot be applied because of the drag on the shoulder. If the glenoid is markedly displaced, it may be necessary to apply lateral traction on the arm with a wire through the olecranon. If the greater tuberosity of the humerus is fractured and displaced, the shoulder will likewise need to be supported in abduction.

Fracture-dislocation of the shoulder must be reduced at the earliest possible moment because of the danger of pressure of the humeral head on the axillary vessels. If the neck of the humerus is fractured and the head dislocated, it is usually necessary to explore the shoulder, reduce the dislocation and the fracture by direct manipulation and then apply lateral traction on the fractured humerus.

Fractures of the shaft of the humerus, when associated with other injuries, are best treated by the application of a hanging cast if the patient can sit up in bed. If other injuries prevent raising the head of the bed, it will be necessary to treat the fracture with lateral traction by means of a wire through the ulna or with overhead traction on the humerus and with the forearm in a sling. If both humeri are fractured, it is impractical to use two hanging casts so some combination of these methods must be worked out.

Fractures of the condyles of the humerus, with associated injuries, are best treated by manipulation under anesthetic and cast. Sometimes this is facilitated if the blood in the joint is aspirated before the manipulation is attempted. If the fragments are markedly displaced, it may be necessary to open the joint, replace them and secure them with wires or screws. If the condition of the patient makes an open reduction inadvisable, lateral traction on the arm with overhead traction on the forearm followed by early motion may save much of the elbow function.

Fractures of the olecranon, with associated injuries, practically always require some type of internal fixation. If the fracture fragment is large, it must be replaced and secured with a wire or screw through the fragment into the shaft of the ulna. If there are many small fragments, they should be removed and the triceps tendon sutured to the ulna. In any case, it is very important to begin early motion of the elbow unless there is the complication of other fractures in the same extremity.

Fractures of the head of the radius, with associated injuries, can sometimes be replaced by direct pressure over them while the forearm is slowly pronated and supinated. In children, the fragments must always be replaced by conservative means. In adults, it may be advisable to remove the head of the radius if it is comminuted or markedly displaced. If resection of the head of the radius is indicated, it should be performed relatively soon after the accident before scar tissue forms about the fragments. After resection, it is important to begin early motion of the elbow if there are no associated fractures of the humerus or of the forearm bones (fig. 1).

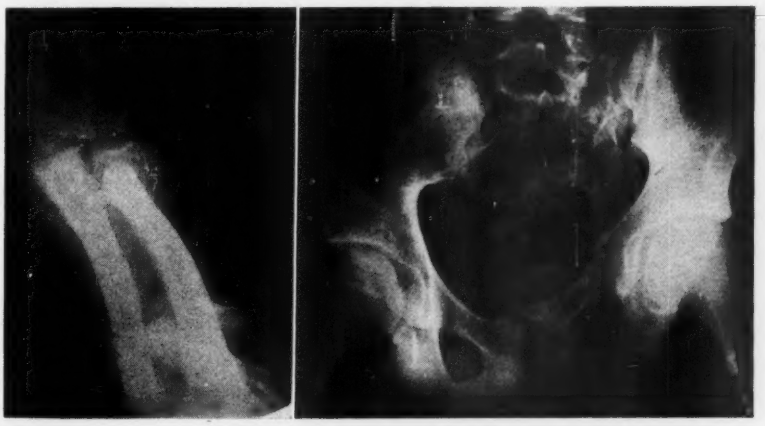

Fig. 1. L. K. T., male, 33, turned over in car. Fracture of the pelvis (right ischium and pubis), dislocation of the right elbow, and fracture of the head of the radius. Dislocation of the elbow needed to be reduced immediately to prevent circulatory damage. Head of the radius required excision at the same time. Three weeks immobilization of the elbow for the dislocation prevented early motion to overcome the effects of the radial fracture. Fractured pelvis treated by bed rest for six weeks because the patient could not use crutches until he had completely recovered from the elbow injury.

Dislocations of the elbow must be reduced immediately if at all possible. Reduction is ordinarily not difficult if the patient can be given an anesthetic. If it is not done within the first few hours, there is danger of permanent limitation of joint motion. Post-

reduction x-rays may reveal a fracture of the coronoid process of the ulna which was not observed previously and which delays exercise of the joint.

Fractures of the bones of the forearm, with associated injuries, may be treated by direct manipulation and cast or by vertical traction with a wire through the lower end of the radius and ulna. If there is marked displacement, or if reduction cannot be achieved by traction, the fractures will need to be explored and secured with intramedullary pins.

Fractures of the wrist, even when there are associated injuries, can generally be reduced by manipulation under anesthetic and application of cast. If the patient's condition prevents a general anesthetic, local anesthesia will make it possible to reduce the fracture satisfactorily. Dislocations of the carpal semilunar bone must be reduced early since delay will make it necessary to explore the fragment to replace it.

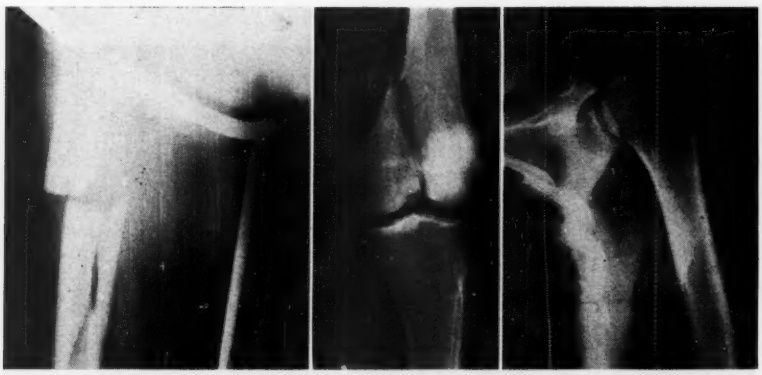

Fig. 2. E. G. H., male, 30, head-on collision. Fracture of the shaft of the right femur, fracture of the medial condyle of the right femur, fracture of upper six ribs on the right, and head injury. Traction on the right leg maintained adequate reduction of the condylar fracture of the femur but did not allow the shaft fracture to be properly approximated. Bone graft to the femur was later necessary. Fracture of six upper ribs on the right and hemothorax made the use of crutches impossible for more than two months after the accident and caused some permanent limitation of abduction of the shoulder.

Fractures of the pelvis, with associated injuries, can be adequately treated by the bed rest that is necessary for the treatment of other fractures. However, if there is marked displacement of the fragments or if one of the hip joints is involved, it may be necessary to apply traction to the legs or to suspend the patient in a sling. If there is an associated fracture of the femur, traction on the leg will not reduce the displacement of the pelvic fracture.

Fractures of the hip are best treated by open reduction and internal fixation with a Smith-Petersen nail; but, since this is a rather extensive operation, it cannot be undertaken until the danger of shock is past. Meanwhile traction to the leg is necessary to prevent pain and shock. Open reduction is inadvisable if there are other long bone fractures in the same extremity. If, for any reason, the hip cannot be secured by internal fixation, the next best treatment is closed reduction and application of a body cast.

Fractures of the shaft of the femur, with associated injuries, are best treated by the insertion of skeletal wire traction through the upper end of the tibia. If there are several fractures in the femur or in other bones in the same extremity, the femur may need to be secured by the insertion of an intramedullary nail or by the application of metal plates and screws to the bone. However, such an extensive operation should be considered only if the patient's general condition is good (fig. 2).

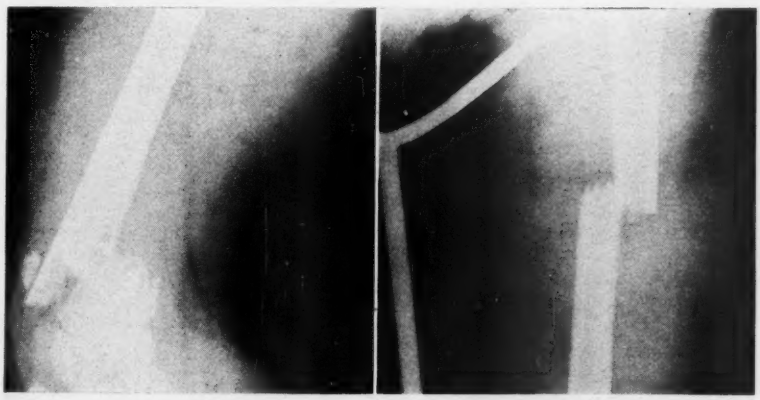

Fig. 3. D. R. H., male, 12, knocked down by car and wheel passed over both thighs. Fracture of the shaft of the left femur and comminuted fracture of the lower end of the right femur with compression of the popliteal blood vessels. Fractured left femur treated by wire traction through the upper end of the tibia. Fractured right femur treated by wire traction through upper end of the tibia with entire extremity in vertical position to protect the circulation which had been damaged by the displaced fracture fragments.

Fractures of the condyles of the femur, with associated injuries, may be treated by direct manipulation or traction. If, however, there is marked displacement that cannot be reduced, it may be necessary to explore the fragments and lever them into position. In either case, early motion of the knee joint is essential to gain good function and yet this is impossible if there are accompanying fractures involving the shaft of the femur or tibia (fig. 3).

Fractures of the upper end of the tibia, with associated injuries, are best treated by skeletal traction through the calcaneus or the application of a cast. If the fragments are widely displaced, it may be necessary to mold them into position with a screw clamp or to secure them with some type of internal fixation such as a screw or bolt. If possible, the tendency to knock-knee must be overcome by applying a cast in the over-corrected position, but this cannot be done if there are other fractures in the thigh or leg.

Fractures of the shaft of the tibia, with associated injuries, can usually be reduced by closed manipulation and application of cast. If the fragments cannot be engaged properly, or if there is comminution, it may be necessary to insert wires or pins above and below the fracture and incorporate them in a cast. Otherwise, traction through the calcaneus will suffice.

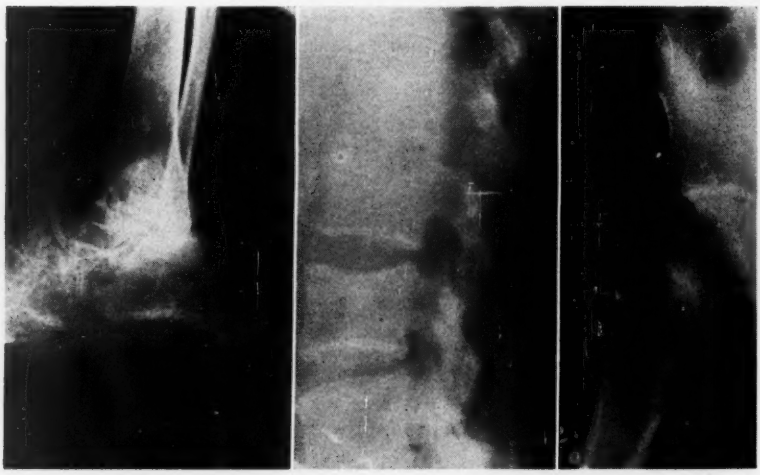

Fig. 4. W. G. S., male, 44, crashed in small airplane. Fracture of the second lumbar vertebra, fracture of the neck of the right femur, compound fracture of the right ankle, loss of all front teeth, and concussion. Right ankle explored immediately with local anesthetic and devitalized bone removed. Two days later, when patient could stand anesthetic, spine hyperextended, right hip reduced, and body cast applied from the axillae to the tips of the toes.

Fractures of the ankle can ordinarily be reduced by manipulation under anesthetic even if there are associated injuries in other bones. If there is comminution of the lower end of the tibia, or if an anesthetic cannot be given, traction through the calcaneus will support the fragments in fairly satisfactory position (fig. 4).

After-Care of Multiple Fractures

During the time that the patient is in bed, essential joints must be exercised to prevent permanent disability. For instance, the shoulder must not be allowed to remain motionless in one position while there are casts or splints on the upper extremity. In addition, the fingers and toes must be kept supple by regular exercises and the knee function preserved by quadriceps-setting exercises.

It is extremely important to prevent the development of deforming and disabling contractures of joints during the time that the patient is recovering from the accident. Persistent flexion of the knee or plantar flexion of the ankle, both of which are very disabling, can be prevented by the use of casts or splints.

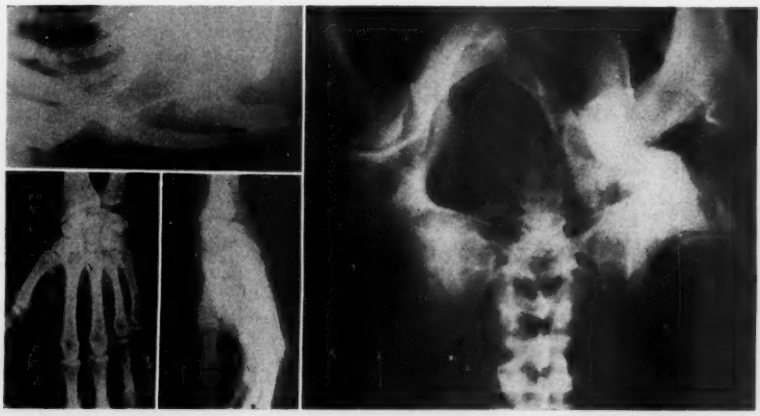

Fig. 5. F. J. F., male, 27, walked off of second story porch during somnambulant trance. Dislocation of the left shoulder, central dislocation of the right hip, dislocation of proximal row of bones of left carpus, and rupture of bladder. While under anesthetic for repair of bladder, dislocated hip and shoulder easily reduced. Carpal bones could not be reduced and required excision of the proximal row four weeks after the accident. Was never able to use crutches because of wrist and shoulder injuries.

A patient who has a fracture in the upper extremity, and therefore cannot use crutches, and with an injured lower extremity, can sometimes be made ambulatory with a walking cast on the leg and a cane or crutch on the sound side. Also crutches can sometimes be altered by utilizing a forearm rest to carry the weight on the elbow.

A patient who is convalescing from many fractures may need to use leg braces and a walker when he first starts bearing weight to provide the maximum protection of the various fractures, and to prevent the development of deformities.

The patient who has received multiple fractures must be made aware of the fact that his recovery will be considerably delayed beyond the usual period required to overcome a single fracture in a single extremity. The rate of recovery is slow, because of the severe initial shock, and the healing time of all the fractures may extend far beyond the normal intervals since the body is called upon to make many repairs simultaneously (fig. 5).

Summary

Multiple fractures in the same patient are becoming more common because of the increasing number of severe automobile, airplane, and industrial accidents. The problems of treatment of patients with multiple fractures are often quite complicated and require considerable patience and ingenuity on the part of the surgeon and the patient.

In this study of 287 fractures in 116 patients, it was noted that the importance of correct and prompt initial treatment could not be overemphasized.

Immediate decisions must be made as to which injuries can be treated later and which must be treated at the earliest possible moment. In spite of these multitudinous difficulties, it is still the responsibility of the surgeon to strive toward the preservation of all the essential bone and joint functions.

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THE MEDICAL PROFESSION AND THE HOSPITALS. ARE THEIR PROBLEMS RESOLVABLE?

ARE the differences between physicians and hospitals resolvable? I think they are, but I am sure that they are not now nor ever will be at the national level. The AMA and the AHA are both organizations officered by honorable men, but in both instances their authority is limited, as it should be. I do not believe that either organization has any legal authority of its own. At least I can speak for the AMA. It is a Federation of State Medical Societies and the State Societies are merely Federations of County Societies. The County Society, then, is the place where all controversies should be discussed, settled, and action taken. Both the State and National organizations can be very helpful in an advisory capacity, but as the Federal Government is too far away to handle local situations in our National political life, so is the AMA too far removed to settle these local controversies. If we object to the Federal Gov-

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Vice-Chairman, Council on Medical Service, American Medical Association; Chairman, Correlating Committee on Extension of Hospitals and Other Facilities.

Presented during the Washington Assembly of the Southeastern Surgical Congress, March 6-9, 1950.

ernment having full authority in our political, economic, and social life, why then should we insist that a central medical organization solve our local medical legal problems? To fight for one philosophy for those who govern us politically and then paradoxically to demand another philosophy for our own medical organization is as absurd as it is impractical. These views have already been expressed by your speaker in his report to the Board of Trustees and the House of Delegates of the AMA as the Chairman of the Special Committee appointed by the Board of Trustees to study this problem and offer suggestions for its solution.

The County Society is the only group that has any real authority in the medical political organization. The delegates from the County Society decide State policies, and this is as it should be; the State delegates meeting as the House of Delegates of the AMA decide general overall National policies. Too often in the past, the County Societies have been negligent in their duties and for many reasons. The relationship in the County Society is often too personal, and we have been motivated in our lack of action by the human elements of fear, selfishness, and worst of all, jealousy. The reactions of the managements of many hospital superintendents have in many cases been based upon this weakness in our individualistic personal relationships. Many of these men who manage our hospitals are very ambitious and they have often played one group of physicians against another knowing that they are reasonably safe from physician reprisals both because of selfish individualism and public opinion. Physicians won't strike. Their training and the service rendered to the public in our humanitarian efforts prevents any group of physicians from refusing service to the sick. This is as it should be. The position taken and the statements and actions of professional men and hospital managements is not unknown to the professional politicians with great personal political ambition. These men with a keen ability to judge the reactions of public opinion have attempted to jockey the medical profession into the unenviable position of appearing unwilling to be of service to the public. They attempt to twist everything we do and say in our fight against the Federal Compulsory Sickness program in an endeavor to make the public believe that all we are interested in is ourselves and the money we can make for ourselves without thought of the public welfare. Unfortunately, there are some vivid examples of this type of professional man, but we are human beings and every group has its black sheep. In medicine, ONE MAN can undo all of the good results obtained by the hard conscientious work that the majority of quiet efficient medical men perform day and night all over this great country.

I have stated before and I now re-state that the hospital is the workshop of the physician usually furnished him by the public—usually with a Board of Managers or Governors selected from hard-headed successful business men in a community. These men employ a superintendent to represent them. They are answerable for all of the financial responsibilities of the institution and likewise to some extent for the type of men and the calibre of the work done in the institution. They have grave responsibilities. The superintendent as a rule is anxious to make his institution self-supporting—NOT TO MAKE MONEY—unless perhaps the hospital can be classed as a purely private institution and receives no outside financial help. Most of our hospitals in America cannot be so classed.

Certain evils have grown up in our hospitals. Like Topsy, they have just grown. At first, many of us were glad not to notice these little evils as they were developing but we as physicians, great individualists, ambitious and hard-working men never paid much attention to these so-called evils in hospital arrangements until our toes were stepped on or at least until there became a threat that our toes would be stepped upon. Half-hearted attempts were made by certain groups who felt they were being exploited to call attention to practices which they felt were unethical at the hospital level or at the County level. Many men have willingly accepted and signed contracts with hospitals and the latter must not always be blamed for some of the situations that individual physicians have readily accepted. All of you are familiar with the actions and reactions of all the various medical men on the hospital staffs and in the local medical Societies. Men perfectly satisfied with their own condition of servitude, shall I say, did not want to do anything locally to upset their own satisfactory conditions. There was a lot of talk, some of it heated, most of it ineffectual, and the continued development of unsatisfactory hospital-physician relations became more pronounced. The hospital needed money not to make money but to make ends meet and to expand its services so that we ALL could have a workshop and the sick public could be served. If one group of medical men seemed to be in trouble with management, it was, and in many instances still is, of no interest to the other professional groups on the staff. Some of this is the fault likewise of management who in many instances, when financial problems have faced them, have never taken the professional staff into their confidence and seldom, if ever, have asked or consulted the professional staff as to ways and possible means of obtaining the necessary financial relief. Too often, management and Boards of Trustees or Managers have no professional representation and if a physician offers some financial suggestions, or asks any questions concerning charges,

et cetera, he is often brushed aside. This should be rather an unusual procedure if it were not remembered that "doctors are supposed to be poor business men." Management might find us very good business advisors because it is axiomatic that the hospital is a dud without an efficient staff and vice versa—and service to the public is the all-important issue.

If the so-called voluntary hospitals are to continue to grow and improve, something has to be done to help keep them solvent or else we will not have a workshop. To my mind, this is almost as much our problem as it is management's. I do not have to remind you that the private philanthropist who used to balance our hospital budgets has been taxed out of the field by the Federal Government. We must be careful that the Federal aid to our hospitals comes to us through State governments to augment State aid so that the hospital cannot be used by the Federal government as an opening wedge for the Federal control of the practice of medicine through the back door. I am afraid at times that the terrific VA hospital building program, intended originally to take care of service men with service-connected disabilities, has opened its doors to all ex-service men who become ill. At the present time, there are many unoccupied beds in the VA hospitals and it is only a question of time before government medicine will be offered to service men and their families whether or not they can afford private service. In some areas, this practice is already in effect. Thinking along the same lines, there should be great care, careful planning and co-operation between our great University teaching centers and the County, State, and American Medical Associations or their programs could lead down the same road to regimentation. The medical school programs should be planned with mutual satisfaction to all, along legal and ethical lines. It therefore behooves us to still remember that every State in the Union has specific laws concerning who may and who may not practice medicine, and that only a responsible individual can be so licensed and is liable. The multiplicity of problems concerning all hospitals and their relationship to us as a profession is a natural result of the very rapid demand for expansion of scientific services from both the physician and the institutions. Bad habits here and there have developed both on the side of management and of the profession. Certain developments which were considered normal twenty years ago have as the result of indifference on the part of most of us resulted in Frankensteins that now loom up to divide the medical profession into antagonistic groups with many of these groups antagonistic toward our necessary ally, the hospital.

For example, the Certifying Boards were originally merely an

effort on the part of the profession to make a physician who claimed certain especial training to qualify for the work he claimed he was best able to do and to prove himself. The Boards never meant to interfere with older men who had been tried and found true, but they were to become standards for younger men who had, shall we say, especial talent and were willing to spend the extra time to become especially skilled in a specialty. The Boards were never intended to divide the profession into those who were certified and those who were not with an odium attached to those who were not. Some of our hospitals, however, immediately dropped older tried and true men from their staffs and would accept as active staff members only those men who were certified by the Specialty Boards. I am sorry to say that some of our physicians aided and abetted them in this procedure. This was unfair and thoughtless to say the least. As a result of some of these hasty decisions, various controversies rose immediately, although they had been brewing for a long time between a few of the specialties and hospital management which are not now resolved and are the cause of a great deal of heated discussion without much improvement in physician-hospital good will. These schisms, in both the ranks of the profession and the hospitals, have been reflected in the struggle that American Medicine is having with the politicians who, for personal political reasons alone, are advocating the Welfare State. We are endeavoring to create, a little late to be sure, a good Public Relations program to help us fight the destruction of our profession. We are succeeding in spite of our various differences and yet we can destroy the private practice of medicine if we permit our hospitals to be directly financed by the Federal Government. Unless, then, we resolve our differences satisfactorily—unless we are willing to help the hospitals in their financial troubles—unless we are willing to compromise everything except our FUNDAMENTAL PRINCIPLES concerning that which is decent, legal and ethical—then eventually we can expect defeat. You and I know when that happens, the hospitals, the profession, and more important than either, the public will suffer.

Again, I say, even in spite of all of our differences, if we are really interested primarily in the alleviation of human suffering, if our ultimate goal is NOT the Almighty Dollar, I am convinced that we can resolve our differences.

How? Each County Society should have a Committee on Hospital Relations composed of outstanding, fearless, unselfish men who will take an active interest in physician-hospital relations. I am convinced that when a controversy arises then between the hospital and an individual, or when hospital finances are in question, these men sitting down and hearing both sides will find a satisfactory

solution to our individual and collective problems. There should be the same kind of a committee at the State level. Should a problem become unresolvable at the County level, both sides could bring their problem via the State Board of Trustees to the State Committee. Here, if the problem cannot be solved, the portfolio could be sent up to the Hospital Committee of the Council on Medical Service of the AMA and the problem could be studied and if here unsolvable, a joint meeting with a similar committee of the AHA could and should go into action.

As Chairman of the Correlating Committee on Extension of Hospitals and Other Facilities of the Council on Medical Service of the AMA, I can report that we are continuing a study of all of these problems, and we hope, by consultation with the specialty groups, the State and County Societies and the AHA to establish ethical, legal, and public interest principles so that eventually the antagonisms that now exist may disappear and that both the profession and the hospitals will be unified in their thinking and in their actions for the public good. What can we as a profession do in the meantime? Much! We can let our hospital people know that we are interested in their financial welfare and in their development and improvement. We can help them solve their problems if they will cooperate with us and if both will be unselfishly honest with each other.

I happen to be a Protestant whose clinic is in a Catholic hospital. One of my partners is a Protestant and the other is a Catholic. My pathologist and photographer are Jewish boys. My hospital exploits me if you want to call it that, and I exploit the hospital, if you want to call it that. However, the hospital authorities are interested in our work—they do everything they can to facilitate it. In return we do everything we can to help the hospital financially so that we do not understand our program as exploitation but as mutual cooperation. We both benefit far beyond our wildest dreams of a few years ago—but far more important—we are both giving the public a service that is recognized by the public to such an extent that the public, as represented by our patients, has contributed enough to endow our clinic.

I am sure I can say without mental reservation or hesitation—"Yes, our problems ARE resolvable."

Erie, Pa. ELMER HESS, M.D.

DR. LLOYD NOLAND
1880-1949

DR. LLOYD NOLAND

With the unveiling of a bronze plaque before the Employees Hospital of the Tennessee Coal, Iron and Railroad Company, the name of the late Dr. Lloyd Noland, Southern pioneer in industrial medicine, on April 22 became permanently affixed to the institution he founded 30 years ago and directed until his death last year.

In dedication ceremonies on the lawn of the hospital, located in Fairfield, Alabama, Robert Gregg, president of the Tennessee Company, paid tribute to Dr. Noland as he officially designated the steel concern's infirmary the Lloyd Noland Hospital. Unveiling the stone was Clifford Osborne, negro male nurse who had first become associated with Dr. Noland when the two had served in the Colon Hospital during the construction of the Panama Canal, and had worked with him for the ensuing 43 years.

Featured speaker at the dedication was Dr. G. V. Brindley, of Temple, Texas, president of the Southern Surgical Association. Messages of greeting from Benjamin F. Fairless, president of United States Steel Corporation, and Dr. Ernest Edward Irons, president of the American Medical Association, were read to the assembly which included relatives and professional friends of Dr. Noland. Master of ceremonies for the occasion was Dr. E. Bryce Robinson, Jr., Dr. Noland's successor as superintendent of TCI's Health Department.

Dr. Noland had come to the Birmingham District in 1913, at the request of George Gordon Crawford, then president of the Tennessee Company, to assume the task of cleaning up a health situation which saw TCI employees plagued with malaria, typhoid, smallpox and diseases of the digestive tract and resulted in a labor turnover for the company of almost 400 per cent a year.

Under his direction a health service was set up which reached all company villages and which in a space of a few years reduced the incidence of infectious diseases to almost negligible proportions.

Conceived by Dr. Noland and built under his immediate supervision, the 350-bed hospital which now bears his name was completed in 1919. A five-story brick building located within sight of most of the Tennessee Company's major operations, it houses complete medical surgical and dental facilities for the company's more than 30,000 employees and their families. Since the first patient was admitted in November, 1919, more than 200,000 bed patients have been treated within its walls.

In his dedicatory remarks, Mr. Gregg said of Dr. Noland: "I have dealt with him as a co-worker in the great enterprise that we

call the Tennessee Coal, Iron and Railroad Company, and have found there the qualities of dynamic leadership and wholesome understanding and cooperation that accounted for his great success as the administrator of our Health Department.

"I have been his patient and have known what it meant to feel his heartfelt human interest in one who is sick. Certainly I know of no finer medicine or tonic."

May 9, 1950

BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The editors do not, however, agree to review all books that have been submitted without solicitation.*

THE FIRST ANESTHETIC. THE STORY OF CRAWFORD W. LONG. FRANK KELLS BOLAND, M.D., Professor of Clinical Surgery, Emory University School of Medicine. President, Crawford Long Memorial Association. The University of Georgia Press, Athens, 1950. $3.00. 160 pages.

This volume is the report of a lifetime hobby, study, and research. Dr. Frank Boland has spent many years and much time in proving that Crawford W. Long, who lived in a small town in northeast Georgia, was the world's first anesthetist. This volume is a tribute to Dr. Crawford W. Long and to Dr. Frank Boland. For here the author has brought together in this small volume undeniable proof that Crawford Long did give the first anesthesia. Dr. Boland has also introduced us to the man, Crawford W. Long.

The volume is divided into eight parts. "The Previous Attempts at Anesthesia," and "Surgery without Anesthesia," comprise the first two parts. The third part, called "Preparation," introduces us to Crawford Long and gives us his background. Part four, "Achievement," tells of the actual giving of the first anesthetic. The next two sections bring forth the proof in many letters and documents which establishes beyond doubt Crawford W. Long's priority as the first to employ effective ether anesthesia in a surgical operation. It tells of the controversy of Wells, Morton, and Jackson, how Jackson found the secret from Long and introduced it to Morton who later tried it in Boston. The last part of the book tells of Crawford W. Long's later life, how he moved to Atlanta and then to Athens, where he died suddenly on June 16, 1878.

This is a volume which is a must for the shelves of all surgeons for herein is contained the proof, as well as the romance, of the very First Anesthetic The printing is good; the illustrations are well chosen and interesting.

A. H. LETTON, M.D.

WOMAN'S SURGEON . . . LIFE STORY OF J. MARION SIMS. Seale Harris, M.D. Macmillan Co., 1950, 452 pages.

This is a remarkable book, written by one of the South's leading physicians about one of the South's leading surgeons, father of modern Gynecology, J. Marion Sims. Dr. Harris, in a truly excellent manner of writing, has described the successes and failures, the romances and the sorrows, the triumphs and the disasters of one of the South's greatest sons, one of America's greatest physicians, a leader in international Gynecology. Dr. Sims has been a surgeon to slaves and to queens, a medical prima donna of the nineteenth century.

One of Dr. Harris' lifetime hobbies has been the study of the life of Marion Sims and this book is the culmination of that study. It tells the life of Marion as a frail, handsome boy—in love with a girl, who was supposed to be too good for him, and acutely aware that his father expected him to be a lawyer while his mother wanted him to be a minister. Finally he studied medicine, and drifted along rather casually through school and through the first years of

his practice. He finally settled in Montgomery, Alabama, gradually becoming aware of his inherent skill as a surgeon. Because of a disaster involving his use of forceps in a difficult delivery, which he detested, he finally worked out on a group of slaves a technique of the repair of vesicovaginal fistula. Because of ill health, he moved to New York where, after many heartbreaks, living from hand to mouth, he finally founded the Woman's Hospital of New York. Thereafter, his life was one success after another, with few interspersed disasters and heartbreaks, mainly the death of his son, Granville, the accusation of the New York Academy of Medicine of his unethical conduct, which in truth was not his own conduct but that of others, as well as frequent quarrels over the management of the Woman's Hospital and his personal feud with Dr. Bozeman. After his return from Europe, where he went during the Civil War, in which he did not take part, he was finally replaced in his position in the Woman's Hospital, only to be removed. While in Europe, he treated, among others, Eugenia, the Empress of all France, and served the Emperor, Napoleon, as well as many other famous personages.

Marion Sims was one of the first to recognize and utilize Lister's antiseptic methods of surgery. He was a major champion of another great Southerner, Crawford W. Long, and through his efforts Long was brought to the attention of the world as the first to use ether anesthesia.

"With the glamour of success came the pangs of bitter opposition and professional jealousies. As we see, Marion is not only a shining figure, glorifying in success, but also, in his moments of anger, and unhappiness. Right up to the moment of his death, we never lose sight of the fact that J. Marion Sims was a very human person. He was not without egotism over his fame, nor without the outbreaks of temper when he felt injustice, nor genuine remorse when he felt sorrow, and yet he was at all times a sincerely devoted husband, father, and friend."

In this book, Dr. Seale Harris has given us an authentic account of the great life of J. Marion Sims and all that he has done for Surgery and Gynecology; and, in addition to this, he has offered an honest and unprejudiced portrait of a great medical personage, who at one time held the coveted position of President of the American Medical Association. This is a book that will be enjoyed by the medical profession as well as by laymen. It is well done, interestingly written, and a tribute to both Dr. Harris and Dr. Sims.

A. H. Letton, M.D.

Clinical Uses of Intravenous Procaine. David J. Graubard, M.D., Milton C. Peterson, M.D. Springfield, Ill.: Charles C Thomas, 1950, 104 pages.

This is another monograph in the American Lectures in Anesthesiology, which is edited by Dr. John Adriani of New Orleans and it covers rather extensively the subject of Procaine used intravenously in various diseases. The monograph begins with the introduction of the history of the uses of Procaine. Following this, chapter two gives the chemistry and pharmacology of Procaine. Chapter three outlines the intravenous local anesthesia use of Procaine, which was first introduced by Dr. August Bier in 1909 in Germany. Chapter four deals with the treatment of pruritis, using Procaine intravenously. The succeeding chapters deal with the following subjects: serum sickness and other states of sensitivity; analgesia of burns and postoperative pains; acute arrhyth-

mias during anesthesia; pain in traumatic and inflammatory conditions; acute anterior poliomyelitis; and then other indications, such as, obstetrical anesthesia, embolism, anuria, the eye, asthma, transfusion reactions, frostbite, toxic symptoms in infants, and eclampsia.

This is a well written monograph, which in detail has summarized the uses of Procaine intravenously and it should find its place on the bookshelf of all surgeons, as well as medical men. It is well worth while.

A. H. LETTON.

ABSTRACTS FROM CURRENT LITERATURE

CHRONIC INTUSSUSCEPTION IN INFANCY. Harry Medovy. *The Journal-Lancet 70*:188-189 (May) 1950.

Chronic intussusception is a rare occurrence in infancy and is not to be confused with the intermittent or recurrent form. There is usually periodic vomiting, attacks of severe "colic" and progressive and rapid loss of weight, whereas in the recurrent type weight loss is usually not observed. The author presents the following case report:

"Dale B., male, age 7 months, was admitted to the Children's Hospital of Winnipeg on July 24, because of vomiting and loss of weight. The baby had been well until 3 weeks before admission. On July 3, he was taken suddenly ill with loose stools and colic. Four loose stools were passed within a few hours, and the baby seemed to have considerable intermittent discomfort. The following day the stools were still loose and on one occasion the mother noted blood in the stool. Vomiting occurred on July 4, 5, and 6, after every feeding. The stools became normal on the fourth day of illness and remained fairly normal from then on. For a few days there was no vomiting but then it was resumed and continued intermittently until the day of admission, occurring usually about an hour after feeding. The baby appeared to have severe 'cramps' almost every day, and there were several episodes of screaming and drawing up of legs. There was a loss of three pounds in weight during the 3-week illness. Because of the continued vomiting, recurrent abdominal pain, and marked loss of weight, the child was referred to the hospital by the attending physician.

"Intravenous fluids and oral glucose series were started. Consultation of the second hospital day found a listless baby with evidence of marked recent weight loss. His temperature was normal. The abdomen was moderately distended and a mass was felt in the epigastrium. Palpation of the mass caused the baby to draw up his legs and whimper. The mass had a doughy feel and was difficult to outline but seemed to fill the entire epigastrium. Rectal examination was negative.

"Observed during a feeding, the baby seemed hungry but as soon as he began to take to feeding showed signs of extreme discomfort. He would stop feeding at frequent intervals, stiffen out his body and scream. The mother was then asked to recall the details of the inset of the illness with particular reference to blood in the stool. She remembered then that the blood in the stool on the second day of the illness was considerable in amount . . . she thought about a cupful.

"With the history of an acute onset of abdominal pain, the passage of blood in the stool, the persistence of vomiting and marked wasting over a 3-week period, a diagnosis of chronic intussusception was made. A barium enema was given. The radiologist's report was as follows: 'The opaque enema filled as far as the mid-transverse colon where there was definite evidence of an intussusception. This appeared unusual in that there was a large amount of small bowel filling the cecum, ascending and part of the transverse colon.'

"At operation (by Dr. M. R. MacCharles) the intussusception was reduced with considerable difficulty. The apes of the intussusception consisted of small bowel which had advanced to the splenic flexure. The bowel was extremely congested but the circulation seemed to be unimpaired. Recovery was uneventful. The child took his feedings well. There was almost no postopera-

tive vomiting and intravenous therapy was discontinued on the third post-operative day, exactly one month from the date of onset of his symptoms. He has remained well."

A reproduction of the most unusual x-ray plate is included.

R. H. S.

ESTUDO ANATOMICO DE PARTICULARIDADES NORMAIS E PATOLOGICAS DA SUPERFICIE INTERNA DA VEIA ILIACA COMUM ESQUERDA: ADESOES, SEPTOS E VALVULAS. Liberato J. A. de Dio. *Arquivos de Cirurgia Clinica e Experimental 12*:507-616 (Nov.-Dec.) 1949.

In this unusually extensive communication, the author reports the results of his investigations of the normal and pathological variations of the anatomy of the intima of the terminal segment of the left common iliac vein. The material included 160 cadavers, ranging in age from premature fetus to 108 years of age, about two to one male over female and about one-half whites, one-quarter negro and one-quarter mulatto. Only veins without apparent lesions were considered. The study included four instances of phlebography in the living subject and seven radiographic studies in the cadaver.

In dissection, correlation with skeletal type was noted and projections of the vessels on the vertebral column were recorded. The reciprocal relation of the vessels, the impression of the right common iliac artery on the common iliac veins and the iliac-mediosacral forceps of the left common iliac vein were studied. After the vessels were resected and opened, the spur of the inferior vena cava was observed. Finally, adhesions, septa, and valves were observed, registered, drawn, photographed, and measured. A record of the size of the lumen of the vessels was kept. All numerical data were corrected on the statistical method.

The author's conclusions are quoted:

"1) In the common iliac veins, especially in the inner surface of the retro-arterial, terminal segment (dorsal to the right portion of the termination of the aorta and to the beginning of the right common iliac artery) of the left common iliac vein, such peculiarities as adhesions of the venous walls, endo-venous septa and parietal valves take place. The spur of the inferior vena cava related to the mouths of both common and iliac veins should be remembered.

"2) The adhesions, resulting from a proliferation of the tunica intima which leads to the union of the venous walls, thus reducing the venous lumen, may represent themselves under two types: flat (close connection of the walls) and columnar (union of the walls at a certain distance). The septa are endovenous bands, formed by two bound normal venous walls.

"3) The occurrence of adhesions is very frequent (39.3 ± 3.86) of the 160 examined cases, with greater incidency of the flat type (41 on 63 cases) against the columnar type (4 on 63 cases); the concomitancy of both types is not an infrequent disposition (18 cases).

"4) Adhesions are most frequently localized in the left common iliac vein (59 on 63 cases), being exceptional the bilateral occurrence (3 cases) or the exclusive one on the right common iliac vein (1 case). The most frequent site on the left common iliac vein is at the (retro aortic-iliac) terminal segment (58 cases), and there at the lateral third (44 cases).

"5) The endovenous septa occurred in 15.6% ± 2.86 of the cases and, like the adhesions, were also more frequent in the left common iliac vein (23 on 25 cases). Differing from adhesions they can be found in the terminal segment (13 cases) as well as the infra-terminal one (7 cases). The septa (isolated) are not frequent in the two segments (3 cases). The existence of single septa (20 among 25 cases) is more frequent than the multiple (5 cases).

"6) The adhesions reduce in larger or smaller degree the venous lumen, dividing it or not into two or more channels. The adhesion may reduce more than half of the lumen of the vein (12 cases). Complete obliteration occurs very seldom (1 case).

"7) With the necessary restriction, and based exclusively on the results obtained in my material, there is no sex difference in the frequency of the adhesions, the same occurring with the septa. The frequency of the adhesions in Mulattoes (57.1% ± 8.36), predominated over the Whites (36% ± 5.17) and Negroes (31.5% ± 7.53), without great difference between the two latter. The endovenous septa are more frequent in Whites (21.9% ± 4.45) than in Negroes (5.2% ± 3.60); however, there is no significant difference between the percentages of these two ethnical groups with the Mulattoes (14.2% ± 5.90). As for age, the adhesions appeared only in extrauterine life (at any period) and the septa also during the fetal period.

"8) Under normal conditions the diameter of the left common iliac vein is larger than the homonomous right. The adhesions, with the tendency to reduce that venous lumen, usually acquire an extension which renders equivalent the percentages in which the diameter of a vein is larger than other and reciprocally.

"9) The presence of fusiform, more or less evident, terminal or preterminal bulbs is almost constant (91.2% ± 2.26) in the common iliac veins. More frequently only on the left (62 in 129 cases) than on the right (4 in 129 cases) they occurred in a great number of cases bilaterally (63). In the latter the left one is larger (43 in 63 cases); the same sized bulbs, on both sides, are very rare (14 cases) and more scarce is the predominancy of the vulumn of the bulb on the right common iliac vein (6 cases). The bulbs are dispositions independent from the adhesions. The spur of the inferior vena cava, an almost constant peculiarity (94.4% ± 1.90) may be vertical (73 on 134 cases) or inclined (61 cases). In this case it is more frequently oblique to the left (50 cases) and increases the bulb of the left common iliac vein.

"10) The terminal segment of the left common iliac vein, the most frequent site of adhesions, corresponds to the zone of the lordosis of the lumbar spinal column against which it is pushed by the shock of arteries placed ventrally; the aorta and the right common iliac artery. Its skeletopy corresponds in a great number of cases (40.7% ± 4.61) to the zone that includes the 4th L. V. and the caudal disc of the same. More frequent were the cases of adhesions in which the skeletopy corresponded to the intervertebral disc (65% ± 5.86).

"11) The parietal valves are very rare in the terminal segment of the left common iliac vein. In the examined individuals they appeared in 5.6% ± 1.81 of the cases and they generally were insufficient.

"12) Endovenous adhesions and septa can appear simultaneously—mixed cases—in the same individual (in the same vein or in each one, in the same segment of a vein or in separate segments). The frequency of these cases is low (6.2% ± 1.90). There may be also cases of valves and adhesions

(2.5% ± 1.23) or valves with septa (1.2% ± 0.96); in no case these three types of structures were found.

"13) The adhesions of the venous walls are formed by elastic and connective tissue; they are acquired structures and result from the proliferation in the tunica intima, probably as a reaction to mechanical stimulus—pulsating compression—produced in favorable ground by the arteries (aorta and right common iliac) on the left common iliac vein against the prominent ventral part of the lumbar vertebral column. The endovenous septa, congenital structures, are constituted by the walls of two veins, one placed beside the other, united by the adventitiae, with an interlaying region of connective tissue containing the neuro-vascular structures; they represent remainders of the numerous primitive veins that give origin by fusion, to the trunk of the common iliac veins. Greater frequency of the septa in the left common iliac vein is due to a primitive more complex disposition on this side.

"14) It is possible to evidence the adhesions and endovenous septa by means of radiographic examination. The frequency of the adhesions at the terminal segment of the left common iliac vein and rendering difficult the venous circulation of the left inferior limb should be remembered in the interpretation of phlebographies, in general practice.

"15) The complex development, the particular sintopy and frequent occurrence of several structures modifying the lumen, justify the distinction of a terminal segment in the left common iliac vein. The morphological peculiarities and their practical value lead to suggest that Treatises on Systemic Anatomy and, especially on Topographic Anatomy, should indicate the terminal segment of the left common iliac vein, mentioning, at its level, the narrowing of lumen." R. H. S.

ABOLITION OF PYLORIC SPASM BY ORALLY ADMINISTERED PROCAINE SOLUTIONS. G. Roka and L. G. Lajtha. *British Medical Journal.* 1174-1176 (May 20) 1950.

The authors, having observed that often when the first portion of contrast medium reached the pylorus the sphincter was relaxed and the medium passed into the duodenum without delay only to go into spasm after the initial filling of the duodenal bulb. This observation initiated an investigation of the mechanism of the pyloric reflex. In the course of this investigation it was found that procain given by mouth paralyzed the pyloric sphincter.

The drug was administered in more than 150 normal subjects, and in more than 100 individuals exhibiting pylorospasm by fluoroscopy, and in eleven cases of persistent vomiting associated with gastric ulcer. The dosage used was 100 c.c. of 1 per cent solution slowly sipped by the patient while in the erect position (taking 4 to 5 minutes to consume the draught). This was usually repeated twice daily. The authors were surprised to observe that even the most difficult and hopeless looking pylorospasms that had failed to respond to other drugs would relax with this simple therapy. The relaxation lasted 2 to 3 hours. No side effects were noted from the use of the drug.

The summary is quoted:

"When the stomach is empty the pyloric valve is physiologically open. Closure of the valve is caused by the passage through it of the first small amount of stomach content.

"The injection of 20-40 ml. of acid or base in physiological concentration

into the stomach or duodenum through a duodenal tube does not influence the mechanism of the pyloric valve.

"Stimulation of the sympathetic nervous system (adrenaline) or of the vagus (pharyngeal irritation) causes a sudden but short closure. This is not identical with the physiological reflex mechanism but is part of the integrative functions of the autonomic nervous system (alarm reaction, vomiting, etc.).

"The physiological wormlike movement can be produced by slight local stimulation of the wall of the duodenum (movement of an oliva, slight balloon inflation).

"It is suggested that in the closure of the normal pylorus stimulation of the local nervous system plays the primary part. The irritation is mostly mechanical. This suggestion seems to be proved by the oral administration of procaine, when the resulting paralysis of the local nerve endings opens a spastic pylorus with much greater regularity than atropine or papaverine.

"Procaine was given orally to several hundred cases with spastic pylori, always with striking results. This simple method keeps the pylorus open for hours, has no side-effects, and can be repeated twice daily for several days (50-100 ml. of 1 per cent solution twice daily). It is recommended as a simple therapeutic procedure, useful in functionally spastic pylorus and as a preparation for surgical intervention in cases of organic pyloric obstruction."

R. H. S.

A New Concept of the Cause of Hirschsprung's Disease or Congenital Megalocolon with a New Method of Treatment by Surgery.

Alexander H. Bill, Jr. *Northwest Medicine 49*:341-344 (May) 1950.

Since Neuhauser's studies of twenty cases of congenital megalocolon at the Boston Children's Hospital were reported in 1945, a new concept in regard to the etiology of the disease has emerged. It has been repeatedly demonstrated that a narrowing of the lumen of the colon at the rectosigmoid area is productive of a degree of chronic obstruction which brings about the marked dilatation of the proximal large bowel. Demonstration of this narrowing roentgenologically depends upon careful observation during the introduction of a small amount of radio-opaque medium.

In view of these observations, it was thought that resection of the relatively narrow segment of bowel might result in cure. Since the narrowed segment extends to such a low point as to make abdominal reestablishment of the bowel continuity technically unfeasible, a one-stage abdominoperineal resection with preservation of the sphincter was worked out. Encouraged by the results of the employment of the procedure in 15 experimental animals, the author has employed the procedure in five children with return of satisfactory bowel control in every case.

A brief description of the technic employed is presented. In essence, it consists of resection of the narrowed segment with mobilization of the rectosigmoid and rectum followed by a combined pull-through with a two layered anastomosis accomplished externally.

Study of the pathological anatomy in these cases confirms previous reports that the fault seems to lie in the intrinsic defect in the nerve supply of the upper rectum and rectosigmoid as is evidenced by a deficiency in the mysenteric plexus.

R. H. S.

SICKLE CELL ANEMIA: A SURGICAL PROBLEM. Harwell Wilson, R. H. Patterson and L. W. Diggs. *Annals of Surgery 131*:641-651 (May) 1950.

Patients suffering from an acute attack of sickle cell anemia often present symptoms which may suggest the presence of any several surgical lesions leading to many unnecessary operations. Following a brief presentation of the essential clinical and pathological features of the disease, the author presents a discussion of the various "surgical features" of the disease. Sickling in vivo with resulting increase in blood viscosity producing anoxia in resulting in additional sickling establishes a vicious cycle which eventually results in thrombosis and infarction. The various manifestations of the acute phase depend upon which vessels become involved. The authors state that the following surgical conditions may be simulated in the acute phase of the disease:

1. Acute abdominal conditions (appendicitus, intussusception, etc.); 2. Jaundice; 3. Bone and joint pains and deformity; 4. Leg ulcers; 5. Priapism; 6. Hematuria; and 7. Cerebral accidents.

Seven illustrative cases are presented. One of the cases was that of a patient who had sickle cell anemia with symptoms of acute appendicitis in whom operation revealed an acutely inflamed appendix. The author points out the hazard of presuming that all abdominal pain in sicklers is due to the disease and states that they are just as likely to develop true abdominal pathology as others.

R. H. S.

GAS CYSTS OF THE INTESTINES (CYSTIC PNEUMATOSIS). S. O. Freedlander and Samuel S. Teitelbaum. *Western Journal of Surgery, Obstetrics and Gynecology 58*:192-196 (April) 1950.

Since Bang first reported his case in 1876, only 22 cases of this rare condition have been reported in this country. The disease occurs both in children and in adults, but in children is usually confined to the mucosa and submucosa. In adults, the gas cysts are usually found in the subserosal regions and in the mesentery.

The etiology of the condition is still unsettled. Various authorities have considered it to be of neoplastic, bacterial (gas forming organisms producing lymphangitis) or mechanical origin. Multiple factors may be involved.

Freedlander has recently encountered a case (the second case seen at Mt. Sinai Hospital since 1920) and it is reported in detail in this communication. Briefly, a 62 year old man had been exhibiting symptoms of pyloric obstruction for years and for about four weeks prior to admission had been vomiting everything ingested. Physical examination revealed no positive findings except evidences of dehydration and weight loss. X-ray examination of the upper gastro-intestinal tract showed obstruction just distal to the duodenal bulb and the presence of peculiar air shadows between the liver and the diaphragm. (Unfortunately, the reproduction of this plate is very poor.) The patient's condition was precarious and he was taken to surgery without further ado. At operation, a firm mass was felt at the head of the pancreas (which was biopsied) and about 120 cm. of lower ileum and mesentery were covered with clusters of cysts. A Finney pyloroplasty was done and the portion of ileum involved with the gas cysts was resected. Pathological examination of the pancreatic tissue revealed normally lobulated pancreas without evident abnormality. A detailed description of the gross and microscopic appearance of the cyst is presented.

In discussion, the authors stress that the lesion is benign and should be treated conservatively except in those instances where it may produce obstruction.

R. H. S.

EARLY DIAGNOSIS OF GASTRIC CANCER. David State, David Gaviser, T. Brannon Hubbard and Owen H. Wangensteen. *Journal of the American Medical Association 142:*1128-1133 (April 15) 1950.

In an attempt to identify precursors of gastric cancer, the authors have studied registrants of the outpatient departments of the University (Minnesota) hospitals who, being over 50 years of age and free of gastric symptoms, were considered to fall in the following groups considered to be potential harborers of gastric cancer:

Group 1. Patients with achlorhydria and Hypochlorhydria.

Group 2. Patients with Pernicious Anemia.

Group 3. Persons with a Positive Family History of Gastric Carcinoma.

Groups 4 and 5. Patients with Hemoglobin Values of 11.0 Gr. or less and/or Occult Blood in the Stool.

The following observations were made:

Group 1. Roentgenographic examination revealed 38 gastric polyps and 8 gastric cancers in 1,450 persons with achlorhydria and hypochlorhydria. In another 20 cases, the findings were suggestive of a polyp but not conclusive. In two additional patients, cancers were missed through organizational errors and in a third patient, a carcinoma was overlooked through misinterpretation of the x-ray findings. Of the eight cancers, five were well localized and without metastasis.

Group 2. One hundred and eighty-seven roentgen examinations of the stomach revealed four gastric polyps and three gastric carcinomas in patients with pernicious anemia. Of the three cancers, two were without lymph node metastasis at the time of surgical intervention.

Groups 3, 4 and 5. No gastric cancers or polyps were found in these groups. There were 78, 63, and 62 examinations respectively in these groups.

At the time of writing, 11 of the patients discovered to have gastric polyps by this survey have been operated on and three were reported to be adenocarcinoma. One had regional node metastasis.

At the Cancer Detection Center at the University of Minnesota, from March 1948 through April 1949, 1,795 patients were examined. Twenty silent carcinomas were detected in this group of which one was a gastric cancer. The patients subjected to roentgen examination correspond roughly to the same groupings given above. The cancer that was found measured only 0.7 cm. in diameter and was entirely confined to the gastric mucosa.

The authors conclude that "the results obtained in both the study of gastric precursors as well as at the Cancer Detection Center suggest that it is both possible and practical to survey large groups of persons in an effort to uncover early silent carcinoma."

R. H. S.

TOBACCO SMOKING AS A POSSIBLE ETIOLOGIC FACTOR IN BRONCHIOGENIC CARCINOMA. Ernest L. Wynder and Evarts A. Graham. *Journal of the American Medical Association 143:*329-336 (May 27) 1950.

Convinced that the apparent increase of bronchiogenic carcinoma is real and reflects exposure to some exogenous etiologic agent, Wynder and Graham have undertaken to evaluate the importance of the various exogenous agents suspected of playing a part in the etiology. A preliminary report in the plan of the study was given last year at the National Cancer Conference. The present paper is chiefly concerned with their findings in regard to smoking.

The method of study and the case metarial used is carefully described. For sake of clarity, smokers were classified in regard to the number of cigarettes (expressed as equivalents in pipe and cigar smokers) smoked daily. For purposes of control groups of patients of similar ages with other diseases of the chest were employed as were general hospital populations. The information in regard to smoking was not taken from hospital records but from direct questioning and questionnaires expressly concerned with securing this specific information. Certain groups of cases were interviewed by coworkers at other centers so that it is felt that the present study represents a fair cross section of the country.

The data so obtained are presented in simple clear tables and linegraph charts. Charts illustrating the relation of the duration of the smoking habit are presented. The conclusions are quoted:

"1) Excessive and prolonged use of tobacco, especially cigarettes, seems to be an important factor in the induction of bronchiogenic carcinoma.

"2) Among 605 men with bronchiogenic carcinoma other than adenocarcinoma, 96.5 per cent were moderately heavy to chain smokers for many years, compared with 73.7 per cent among the general male hospital population without cancer. Among the cancer group 51.2 per cent were excessive or chain smokers compared to 19.1 per cent in the general hospital group without cancer.

"3) The occurrence of carcinoma of the lung in a male nonsmoker or minimal smoker is a rare phenomenon (2.0 per cent).

"4) Tobacco seems at this time to play a similar but somewhat less evident role in the induction of epidermoid and undifferentiated carcinoma in women. Among this group, a greater percentage of nonsmokers will be found than among the men, with 10 of 25 being nonsmokers.

"5) Ninety-six and one-tenth per cent of patients with cancer of the lungs who had a history of smoking had smoked for over twenty years. Few women have smoked for such a length of time, and this is believed to be one of the reasons for the greater incidence of the disease among men today.

"6) There may be a lag period of ten years or more between the cessation of smoking tobacco and the occurrence of clinical symptoms of cancer.

"7) Ninety-four and one-tenth per cent of male patients with cancer of the lungs were found to be cigarette smokers, 4.0 per cent pipe smokers and 3.4 per cent cigar smokers. This prevalence of cigarette smoking is greater than among the general hospital population of the same age group. The greater practice of inhalation among cigarette smokers is believed to be a factor in the increased incidence of the disease.

"8) The influence of tobacco on the development of adenocarcinoma seems much less than on the other types of bronchiogenic carcinoma.

"9) Three independent studies have resulted in data so uniform that one may deduce the same conclusions from each of them."

In an addendum, an analysis of 45 additional interviews of patients with epidermoid or undifferentiated cancer of the lungs reflects the same preponderance in the excessive and chain smoking groups. Only one patient in this group was classified as less than a heavy smoker and that one was a non-smoking, 72 year old blacksmith. R. H. S.

THE POMEROY METHOD OF STERILIZATION. Clifford B. Lull and Robert M. Mitchell. *American Journal of Obstetrics and Gynecology 59*:1118-1123 (May) 1950.

The authors report the results of the Pomeroy Operation as performed in one institution (Philadelphia Lying-in Division of Obstetrics and Gynecology, Pennsylvania Hospital) over a 25 year period. The operations were performed by a small group of individuals employing standard procedure. The summary is quoted:

"1. A consecutive series of 1,550 patients sterilized by the method known as the Pomeroy operation is herewith reported.

"2. The over-all incidence of the Pomeroy operation was 2.22 per cent. The incidence in obstetric cases was 1.86 per cent. The incidence in gynecologic cases was 3.17 per cent.

"3. There were four failures in this series, or an incidence of 0.25 per cent; two failures where to our knowledge the Pomeroy technique was not properly executed. The corrected incidence of failure was 0.12 per cent.

"4. The important steps in performing this operation are: (a) to use an absorbable suture since a nonabsorbable suture is likely to cut through the serosa with tuboperitoneal fistula formation; (b) to avoid trauma such as clamping the tube before it is ligated; (c) to see that the tubal loop is made in the middle third of the tube because if it is too close to the involuting uterus, it may cause a slipping of the ligature; (d) a loop of salpinx should be excised which is not too large and not too small, as the removal of a large loop often disturbs the blood supply to the ovary.

"5. The obstetrical morbidity rate among 524 obstetric cases was 22.9 per cent. There were 26.6 per cent of the 214 gynecologic patients who had postoperative febrile reactions.

"6. There was one gynecologic death attributed to a vaginal Pomeroy procedure performed in conjunction with a vaginoplasty.

"7. Puerperal Pomeroy sterilization operations are completed within one to two hours following normal vaginal deliveries to avoid the period of 'probable postpartum hemorrhage' and the period of 'probable puerperal infection'.

"8. One thousand twenty-eight patients, or 66.3 per cent of the 1,550 patients upon whom a Pomeroy sterilization operation was performed, answered 'No' to the follow-up questionnaire, 'No' indicating no subsequent pregnancy.

The authors conclude that, while there is no method of tubal sterilization known to be 100 per cent successful, the incidence of failure with this technique is less than the incidence of failure of other methods described in the literature and state their intention to continue using this method. R. H. S.

ABDOMINAL COMPLETE HYSTERECTOMY. William W. Curtis, Earl Suchow and John W. Huffman. *American Journal of Obstetrics and Gynecology 59*:989-998 (May) 1950.

The authors, in reporting a survey of the abdominal complete hysterectomies performed by the attending and resident staffs of the gynecological service of the Passavant Memorial Hospital during the years of 1929 to 1947 inclusive, question the validity of the widespread opinion that vaginal hysterectomy is safer than abdominal complete hysterectomy. They feel that the results of the survey substantiate their views.

There were 1,034 abdominal complete hysterectomies performed for benign lesions of the genitals in this group. No attempt has been made to separate the series into different groups based upon the simplicity of the procedure of on the clinical or pathological diagnoses. In 449 cases the uterus alone was removed; in the remaining cases, additional abdominal procedures were performed. The summary and conclusions are quoted in part:

" . . . The cases have been arranged in three groups, corresponding to the prechemotherapeutic, the chemotherapeutic, and the antibiotic eras. Morbidity and mortality rates, the incidence of complications, and the hospital stay time have all been notably lowered as a result of the changing attitudes regarding surgical procedures, postoperative care, and the advent of chemotherapeutic and antibiotic agents.

"The over-all mortality rate was 0.29 per cent. One death occurred in the 172 cases operated upon prior to 1938 and two among the 519 cases operated upon between 1938 and 1945. Two of these three deaths were due to cerebrovascular accidents. There were no deaths in the 343 cases operated upon after 1945.

". . . The morbidity rate for the 1,034 cases . . . was 31.5 per cent.

"There has been a marked decrease in respiratory, infectious, gastrointestinal and urinary complications during the past fifteen years. The incidence of vascular and hemorrhagic complications is essentially unchanged.

"Abdominal complete hysterectomy for benign pelvic disease, performed by well-trained gynecologic surgeons, may now carry essentially the same mortality and morbidity hazard as vaginal hysterectomy. Such was not the case fifteen years ago when the vaginal approach was unquestionably safer. This change is the result of new attitudes relative to surgical and postoperative care, and to the advent of chemotherapeutic and antibiotic agents. Today there is little difference in the risks between the two methods of approach and the two operations need no longer be placed on a competitive basis because of presumed difference in surgical risk."

In an addendum, the writers state that they are now able to report 516 consecutive cases with no deaths.

R. H. S.

HYPERTROPHY OF PYLORIC MUSCLE IN ADULT. Experiences with Conservative and Radical Surgical Treatment. James C. McCann and Michael A. Dean. *Surgery, Gynecology and Obstetrics 90*:535-542 (May) 1950.

Gross hypertrophy of the circular muscular elements of the pylorus productive of symptoms of obstruction occurs rarely in the adult. Two distinct types are seen: (1) idiopathic, and (2) concomitant. This, of course, implies presence or absence of associated gastrointestinal pathology. In either case, the hypertrophy is similar to the infantile form with elongation and narrowing of the pyloric orifice. Review of the literature concerning the subject reveals little agreement in regard to etiology. That it is congenital in certain cases

seems definite but this is not true in other instances. In these cases which are acquired (or which become symptomatic late in life) the etiology is enigmatic.

In the final analysis, diagnosis must rest upon suggestive roentgen findings and surgical exploration. The roentgenogram is seldom diagnostic as malignant infiltration may produce identical findings.

Though surgical treatment of this condition in the newborn is fairly well standardized in this country (the Ramstedt operation), a survey of the reported cases in the adult reveals that therapy has varied from simple dilatation of the sphincter to pyloroplasty, gastroenterostomy and subtotal gastrectomy.

McCann and Dean herewith present three case reports. Two of these were of the idiopathic type while the third was associated with multiple superficial gastric ulcers. The first case was originally treated by gastroenterostomy but had a recurrence of symptoms of obstruction and a Bilroth I type of pylorectomy was performed six years later with complete relief. The second case was treated by a Balfour type pyloroplasty. Relief was only temporary. Later, a gastroenterostomy was done elsewhere. The third case (with associated gastric ulceration) was treated by subtotal gastrectomy with a Mayo-Polya anastomosis. This patient's subsequent clinical course was satisfactory. The authors feel that, since the pathology is localized at the pylorus, the Billroth I pylorectomy is particularly applicable in the surgical management of this condition.

R. H. S.

TREATMENT OF ACHALASIA: TRANSTHORACIC APPROACH. Elmer S. A. King and William Lee Malley. *Journal of the International College of Surgeons 13*:402-406 (April) 1950.

Achalasia is secondary only to carcinoma of the esophagus as a cause in difficulty in swallowing and its greatest importance stems from the differential diagnosis of the two conditions. The cause of the condition is not definitely understood but King and Mallet are of the opinion that it results from the degeneration or destruction of the gandlions and connection fibers of Auerbach's plexus, producing a loss of coordination in the circular muscular fiber action of the various segments of the esophagus and manifesting itself chiefly by the constriction of the circular muscle fibers in the lower segment of the organ with dilatation of the supper segments. It is probably comparable in etiology to congenital pyloric stenosis and congenital megacolon.

The presence of pain in 60 to 70 per cent of the cases is in sharp contrast to its absence in carcinoma. The pain is retrosternal and is not related to meals, occurring at any time of the day or night. It may radiate to the angle of the jaw. The patients usually complain of dysphagia, regurgitation, loss of weight and intolerance of cold food and cold drinks.

Conservative treatment with dilatation should be the first choice. When this fails, is considered dangerous due to the configuration of the esophagus, or, for some reason, is not feasible, surgery should be employed. Esophagogastrostomy has produced good results in many instances. The authors feel that recurrence is likely when this operation is used. They present four cases in which, through a thoracic incision, the circular muscle fibers are divided allowing the mucosa to bulge through (as in the Ramstedt operation for pyloric stenosis). They emphasize that while such surgical procedures relieve the obstruction in the terminal portion of the organ, the loss of tone and peristalsis in the upper segments is neurogenic in origin and probably permanent and gravity must be relied upon to effect swallowing. R. H. S.

INTERNATIONAL COLLEGE OF SURGEONS TO MEET

The Fifteenth Annual Assembly of the United States Chapter of the International College of Surgeons will be held in Cleveland, Ohio, October 31 to November 3, with headquarters at the Cleveland Hotel.

Surgical clinics will be held in several Cleveland hospitals on Monday, October 30. All scientific sessions will be held at the Cleveland Public Auditorium 9:00 a. m. to 5:00 p. m. Tuesday through Friday. A most excellent program has been arranged at which time some of the most prominent surgeons of America, and some foreign speakers, will discuss the current contemporary surgical scene.

Through the courtesy of Smith, Kline and French Laboratories, a fine colored television program of surgical procedures, originating from the St. Vincent's Charity Hospital, Cleveland will be shown daily in the auditorium from 9:00 a. m. to 1:00 p. m. Motion pictures will also be presented each day depicting many of the recent advances in surgery and surgical technique.

One of the highlights of the meeting will be the annual banquet at the Statler Hotel on Thursday evening when America's great surgeon, Dr. Frank Lahey, of Boston, will talk on "Some of the Recent Advances in Surgery." Dr. Elmer Henderson, President of the American Medical Association, will deliver an address on "The Importance of International Cooperation in Surgery."

Reservations may be secured by writing to the Committee on Hotels, International College of Surgeons, 511 Terminal Tower, Cleveland 13, Ohio. Preliminary programs may be obtained from the central office, 1516 Lake Shore Drive, Chicago 10.

CORRECTION

Tables and charts on pages 826 to 831 of the August issue of THE SOUTHERN SURGEON which appeared in the paper, "Surgical Management of Ureteropelvic Obstruction, by Austin I. Dodson, M.D., and Donald Gilbert, M.D., of Richmond, should have appeared in another paper, "A Comparative Study of the Effects of Para-Sympathetico-Minetic Drugs on the Urinary Bladder," by the same authors which appeared on pages 812 to 815 in the same issue, to which references were made on pages 813 and 814.

MANAGING EDITOR.

SECTION MEETING OF THE SOUTHEASTERN SURGICAL CONGRESS

The Maryland, District of Columbia, Virginia and West Virginia sections of the Congress held their annual meeting jointly, July 13-15, at the Greenbrier Hotel, White Sulphur Springs, W. Va. A splendid program was presented, and the four groups have decided to meet again next year together in Baltimore, Maryland.

The chairmen of each of the state sections; Dr. Waverly R. Payne of Newport News, Va.; Dr. Harry Lee Claud, District of Columbia; Dr. W. Raymond McKenzie, Baltimore, and Dr. Everett L. Gage of West Virginia, each presided over the scientific sessions.

Hon. Rush D. Holt, former United States Senator from West Virginia, delivered the banquet address on the subject, "The Fable of the Free Lunch." The talk mentioned some of the extravagances in government, and was critical of those voters who fail to exercise their franchise by staying at home on election day.

The W. Va. Section held a business meeting at which time Dr. Francis L. Coffey of Huntington was elected vice chairman of the section and was reelected treasurer. Mr. R. J. Wilkinson, Jr., of Huntington, was reelected secretary.

Dr. J. A. Kyle Bush of Philippi and Dr. A. U. Tieche of Beckley were named to three year terms on the state executive committee, succeeding Dr. James R. Brown of Huntington and Dr. Thomas Kerr Laird of Montgomery.

UROLOGY AWARD

The American Urological Association offers an annual award of $1000.00 (first prize of $500.00, second prize of $300.00 and third prize $200.00) for essays on the result of some clinical or laboratory research in Urology. Competition shall be limited to urologists who have been in such specific practice for not more than five years and to men in training to become urologists.

The first prize essay will appear on the program of the forthcoming meeting of the American Urological Association, to be held at the Palmer House, Chicago, Illinois, May 21-24, 1951.

For full particulars write the Secretary, Dr. Charles H. de T. Shivers, Boardwalk National Arcade Building, Atlantic City, New Jersey. Essays must be in his hands before February 10, 1951.

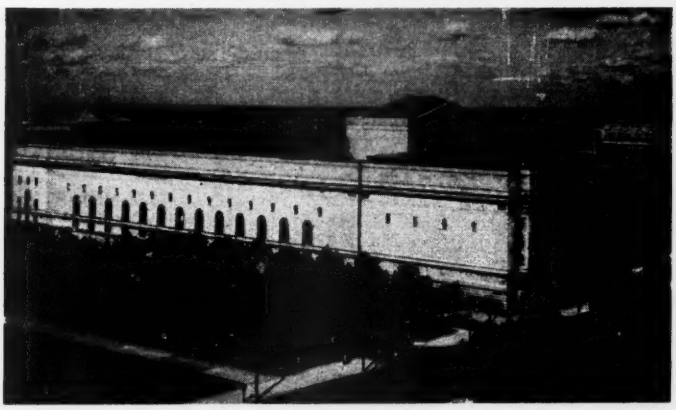
Drawing Final Plans for

Fifteenth Annual Assembly

of the

INTERNATIONAL COLLEGE OF SURGEONS

United States Chapter



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